WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
ISSUED FOR THE INFORMATION OF COOPERATORS
BY THE FISH AND WILDLIFE SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

CONTENTS

	Page
Abstracts:	
Classification	2
Conservation	2
Control	5
Destruction	9
Diseases and parasites	10
Ecology	18
Economics	22
Education	23
Food habits:	
Browse, white-tailed deer	25
Elk browsing	26
Nutritional analyses	26
Toxicity of Crotalaria	27
Utilization of Caprifoliaceae	27
Of coyote	27
Deer, White-tailed	28
Ducks	29
Fox, Red	29
Grosbeak, Evening	29
Hawk, Marsh	29
Hawks	30
Mammals, Small	30
Osprey	30
Owl, Barn	30
Owl, Great horned	30
Oyster-catcher, Black	31
Pheasant and quail	31
Porcupine	31
Prairie chicken	32
Rook	32
Skunk, Spotted	33
Snakes, Garter	33
Waxwing, Cedar	33
Wood rat, White-throated	33
Life histories	34

	Page
Abstracts--Continued	
Management:	
Attracting birds	40
Attracting birds and mammals	40
Beaver	40
Burning marshes	42
Deer, White-tailed	42
Duck food plants	43
Farm game	43
Farm wildlife	45
Field borders	45
Forest wildlife	45
Fur animals	46
Grouse, Prairie	47
Harvest	47
Inventory	49
Land utilization program	52
Mallard	52
Muskrat	52
Overpopulations	53
Planting	55
Planting for wildlife	55
Ponds	56
Shelterbelts	57
Soil conservation in relation to wildlife	57
Stocking:	
Partridge, Hungarian	57
Raccoon	58
Turkey	58
Transplanting, mountain goat	58
Turkey	58
Water holes	59
Wildlife on public lands	59
Winter feeding	60
Author index for this issue	60

Washington, D. C. No. 32 November, 1941

Classification: Birds

Friedmann, Herbert. The birds of North and Middle America, U. S. Nat. Mus. Bul. 50, Part IX (Supt. of Documents, Washington, D. C. 40 cents a copy), ix+254 pp., 16 figs., 1941.

This volume in continuation of the series carried through Part VIII by Robert Ridgway is most welcome. Those who do not know of it, will be glad to learn that manuscript on the hawks and allies (Falconiformes) has been prepared and on the grouse, quail, etc. (Galliformes) is in preparation. To keep the reports in systematic sequence, it is planned to issue the last-named before that on the hawks. The present installment, covering the cranes, rails, coots, gallinules, sun-grebes, and sun-bitterns, is continued in the same style as the previous parts, giving full synonymy and bibliography of each group, detailed descriptions of all plumages, measurements, and outline of range. The chief structural characters of each genus are illustrated. Ornithologists will look forward eagerly to the appearance of succeeding installments and the final completion of this greatest work on North American birds.

Classification: Rattlesnakes

Gloyd, Howard K. The rattlesnakes, genera Sistrurus and Crotalus, Chicago Acad. Sci. Special Publ. 4, 270 pp., 31 pls., 21 figs. (mostly maps), 1940.

Review of literature (17-page bibliography), key to species and subspecies (principal characters illustrated), and annotated accounts, including synonymy, history, description, statement of distribution, locality records, and comment on variation and affinities. The general summary contains discussion of the rattle, size and form, scutellation, coloration, specializations, and center of origin and dispersal.

Conservation: Dangers of commercialization

Beard, Daniel B. Feathers and furs, National Park Service Region Three Quarterly (Santa Fe, New Mexico), 3(4), Oct. 1941, pp. 2-7, 3 photos, (mimeographed).

The dangers of commercialization to animals are pointed out, the plume birds, beaver, alligator, sea lions, diamond-back terrapin, and certain fur animals being commented upon as victims. "Strange to relate, industries that have been dependent upon a perpetual supply of some wildlife species for their very existence have seldom favored conservation. They tend to go after all they can while they can, and make as much money as possible before the species become extinct. And unless something is done about it, extinction is almost certain because when a wildlife species is exploited for commercial purposes--when feathers, hair, body, or bones become an article of commerce--that species is 'on the skids.'" The author reports recent development of a more cooperative attitude on the part of businessmen--a matter for congratulation.

Conservation: Feather trade abuses

Anon. Wild birds and fly-fishing. Is America big enough for both?, National Audubon Society (1006 Fifth Ave., New York, N. Y.) Circular 47, 12 pp., illus. 1941. (10 cents a copy).

"In 1922, when the tariff law was revised, a few additional words were added to the bill, in some way which has not yet been explained, making it legal as well to import the feathers of wild birds, providing affidavits were filed declaring that the plumage was imported and was to be used only for the manufacture of fish-flies. This record has been cited to make it clear that, from the beginning of its new campaign to obtain adequate protection for wild bird life, the National Audubon Society has pointed out that fly-fishermen, as well as manufacturers and importers of fish-flies and feathers, were wittingly or unwittingly contributing to the difficulties of giving adequate protection to wild bird life." The pros and cons of the situation are discussed in the light of the New York law which will end all traffic in wild bird plumage in that State in 1947. Complete removal of commercial incentives to the exploitation of birds seems the only safe course. The ethics of anglers have already developed along desirable lines and it is held that the further step of abandoning use of the feathers of wild birds for fish-flies should not be unsurmountable.

Conservation: Fur animals ✓

MacLeod, Alexander T. The importance of fur resources in wildlife administration, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 68-72.

"Fur is an important commercial commodity and more of it is consumed in the United States than in any other country in the world." The annual take of fur animals is estimated to be worth about 40 to 45 million dollars, and the sales of fur products at retail reaches approximately 275 million dollars. Because we have squandered an originally bounteous natural supply of furs, we now face the alternative of achieving more effective fur-animal conservation and restoration or becoming still further dependent on furs of foreign origin. The restoration of fur animals should have a place in land planning programs, especially as it may be done at a profit. Better control of trapping, including adequate reporting of the catch, and closer cooperation between all factions interested in the fur industry, are required.

Conservation: Fur animals ✓

Wade, Douglas. Fur, fish, and game--some suggested relationships, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 314-319, 5 tables.

Between 1926 and 1938, the fur catch in Pennsylvania had a cash value of nearly 14-1/2 million dollars, exceeding in that respect any one of 16 State agricultural products. The data are recorded in tables. Trappers take animals other than furbearers; their reports on the subject are tabulated;

some useful, but more numerous injurious, species are among them. The value of research upon fur animals is emphasized and a plea made for its expansion. Furbearers benefit by environmental improvements made for other species but deserve to be mentioned in arguments for restoration projects. A table is presented showing that 5 percent of the papers appearing in the Transactions of North American Wildlife Conferences, 1936-41, and the question asked, Is that enough?

Conservation: Musk ox

Yarham, E. R. Canada's fight for the musk oxen, American Forests (919 Seventeenth St., N. W., Washington, D. C. 35 cents a copy), 47(9), Sept. 1941, pp. 424-425, 448, 1 photo.

Once numbering probably a million, the animals have been reduced to about 25,000. Former and present distributions are compared and the habits of the species sketched. Comment on slaughter, especially in Greenland, and on efforts by the Canadian government to preserve the species.

Conservation: National program ✓

Gabrielson, Ira N. The future for conservation, Trans. Sixth N.A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 27-36.

In 1936 the author outlined a national wildlife program; in this paper he reports on progress in Federal and State refuge acquisition, in cooperation between State and national agencies in research and restoration, in recognition of wildlife in land planning programs, in the curbing of pollution, expansion of research, coordination of the activities of Federal land administrative organizations, and in regulating the utilization of wildlife. Results have been encouraging in each of these fields except that of control of pollution. For the future the author urges increased effort toward the restoration of fur animals, better management of fish stocking, preservation of the natural purity of our waters, control of erosion by attention to headwaters, cooperative financing of fisheries research, and resisting menaces to wildlife brought forth in the guise of national defense.

"May I remind you, in closing, that in conservation we may win many contests but if we lose the last one we lose the war. An unwise project for the destruction of natural resources may be defeated fifty times, but if it wins the fifty-first time we might as well have lost on the first occasion. We who understand the value and the vital necessity of maintaining natural resources of soil and water and their products, face a continuous job of making other Americans understand the vital character of this program. We face a never-ending battle to hold off those who would sacrifice anything in the future for immediate gain. And make no mistake, there will always be people, many of them, ready to do this if they can see profit in it for themselves. The forces of conservation will always have such groups to fight. There are now, and always will be, many who would take the last fish, kill the last bird or the last deer, or cut down the last tree, if in so doing they could realize an immediate

personal gain. It is our duty as American citizens concerned with the national welfare and the future of this country to see that these groups do not prevail."

Conservation: Plume trade ✓

Baker, John. An end to traffic in wild bird plumage, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 16-19.

Review of efforts to control trade in feathers and synopsis of a declaration of policy by the industry under which existing stocks shall be liquidated within 6 years and no others assembled.

Conservation: Waterfowl

Gabrielson, Ira N., and Frederick C. Lincoln. What is behind the waterfowl regulations?, Senate Special Committee on the Conservation of Wildlife Resources (Capitol, Washington, D. C.), Committee Print No. 1, 77th Congress, 1st Session, pp. 3-34, 1 pl., 23 maps.

The regulations are based on research, full consideration being given to biological, recreational, and administrative factors. The services of waterfowl observers and banders and of the field personnel of the Bureau in studying and reporting on migration phenomena are detailed and the distribution of these observers indicated on maps. The principal flyways also are shown on maps and the investigations of the biologists assigned to them are described. The annual January inventory has wide scope and represents a strenuous effort to determine the trend of the waterfowl population. General studies of the Service and bibliographic research have given accurate knowledge of the breeding and wintering ranges of the birds. This has facilitated understanding of the effects on the waterfowl of drought and other factors unfavorably affecting the environment. Above all in the United States "with its great army of hunters, the menace of overshooting is ever present." The major problem is "to so restrict the kill as to insure the return of ample breeding stock to the nesting grounds." Based on all available information, the regulations are intended to achieve that objective.

Control: Bobcat

Young, Stanley P. Hints on bobcat trapping, U. S. Dept. of the Interior, Fish and Wildlife Service (Washington, D. C.), Circular 1, 6 pp., 4 figs., 1941.

Depredations of bobcats are described, and directions given as to where to trap, on the use of blind and scented trap sets, preparation of scent, care in details of trapping, and the desirability of resetting traps.

Control: Bounty system ✓

Gerstell, Richard. The advisability of paying bounties for the killing of predators, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 278-281.

The author summarizes the long experience of the Pennsylvania game department in this field as follows: "It would in summary appear that as a general rule it is for three principal reasons unwise to attempt the control of predators through the payment of bounties.

"First of all, the successful operation of any bounty system depends upon precisely drawn legislation which even under present day conditions is most difficult to achieve.

"Secondly, the advantages of the system are far more than balanced by its disadvantages. For example, the educational benefits derived from the practice can doubtless be better and more efficiently accomplished through the public information divisions of the conservation department, using modern techniques including the motion picture and radio, than by offering rewards for the killing of certain birds and mammals. Also, as already pointed out, the system's principal economic advantages are open to question, while most departments should be in position to obtain more desirable research material through the cooperation of its own personnel and other interested persons than through the collection of specimens killed at random by untrained workers. On the other hand, limited application, inefficiency, and the encouragement of fraud are undesirable factors which cannot be entirely divorced from the operation of the system.

"Finally, though some few particular predator problems can admittedly be solved through the payment of bounties, opportunities for such use of the system are comparatively rare. At the same time, the very possession of the power to declare bounties almost constantly places upon the conservation agency strong, though usually unwarranted demands for application of the system to problems which they do not fit. Unfortunately, most departments are not as yet strong enough to withstand public pressure of this type. Thus, the system is likely to be used not only in cases which it does not fit, but also in others based on fiction rather than fact. Needless to say, that is both undesirable and indefensible."

Control: Corn pulling

Chaddock, T. T. An effective pheasant repellent, Wisconsin Conservation Bulletin (Wisconsin Conservation Dept., Madison), 6(8), Aug. 1941, pp. 46-47.

After tests of several repellents, lead oxide was selected for further trial. It was found to meet nearly all of the requirements of a satisfactory repellent and is cheap. It protects corn from both pheasants and rodents. Directions for its application are given.

Control: Coyote

Young, Stanley P. Hints on wolf and coyote trapping, U. S. Dept. of the Interior, Fish and Wildlife Service (Washington, D. C.), Circular 2, 8 pp., 3 figs., 1941.

Why control of wolves and coyotes is necessary; suggestions as to methods of trapping, including: where to place traps, preparing the sets, scenting, and resetting traps.

Control: Pondweed ✓

Smith, E. V., and H. S. Swingle. The use of fertilizer for controlling the pondweed, Najas guadalupensis, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 245-250, 2 figs.

Description of the problem and the method of solving it; the plant is a serious check upon fish production. Authors' summary: "(1) Najas has been controlled in five fish ponds in Alabama by the use of inorganic fertilizers; (2) the fertilizer induces a heavy growth of algae, either filamentous or plankton, which apparently shades out the Najas; (3) the production of fish food, the growth of fish, and the ease of fishing are improved by the use of fertilizer for the control of Najas."

Control: Predator ✓

Kartchner, K. C. Desirability for control of predators in wildlife management as experienced in Arizona, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 273-276.

The Arizona point of view, with a plea for greater Federal expenditure for hunter control in the State, the bounty system being condemned. Comment on the Kaibab deer situation; it is planned to regulate both hunting and predation so that a herd of about 15,000 animals will be maintained. Suggestion that the National Park Service control predators. The author refers to "a balance of Nature, which as we all know, has been so thoroughly disturbed by man that it can never be restored." This sweeping assertion ignores the fact that restorative processes are always in action, and that any tract surrendered by man is taken over by Nature. Consider the Mayan cities buried by the jungle. The new order may not parallel the original balance but always, everywhere, balance, if not attained, is imminent. See "Biologic balance on the farm" abstracted in WILDLIFE REVIEW, No. 30, March 1941, p. 9.

Control: Predator ✓

Riter, William E. Predator control and wildlife management, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 294-298.

The terms "predator" and "control" are defined and the controversy over these subjects briefly set forth. Predation is only one, but may be a leading, factor in limiting wildlife production. Examples are cited of antelope herds in Oregon, California, and Nevada, and of grouse and turkeys in Georgia, and waterfowl in North Dakota; in each of those instances predator control resulted in rapid increase of previously repressed populations. Stoddard is quoted on the desirability of treating predator control as a local problem. The author's conclusions are: "(1) Predator control as a factor in wildlife management should not be overlooked, although it is but one among many others. Its importance in the success of a wildlife-management plan depends entirely

on local conditions--each area is a problem by itself and all cardinal factors should be studied together and each properly evaluated; (2) predation may be a major factor on (a) areas on which the population of the fostered species is subnormal although other conditions are favorable for their development; and (b) on game areas where any considerable part of the increase that would normally be utilized by man is being taken by predators; (3) where breeding populations of the fostered species remain normal for the area, predator control is of little or no consequence in attempting to increase the numbers of the breeding stock; under such conditions, food, cover, and water during the critical period are generally the limiting factors."

Control: Predators upon quail

Stoddard, Herbert L., and Ed. V. Komarek. Predator control in southeastern quail management, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 288-293.

For an appraisal of the problem, the authors have had available to them information from the study of 2,500 quail nests and of the contents of many mammal stomachs, besides years of field experience of their own and of numerous cooperators. Night-hunting for sport and pursuit of fur animals with dogs is no longer carried on so actively in the South as it has been for a hundred years, and as a result predators have increased. Gray foxes have become so abundant as to suffer an epizootic of rabies, which in turn is a menace to dogs. This species of fox, two of skunks, and the opossum are seriously destructive to quail eggs and young in some years but not in others. Checking the increase of these predators should be routine procedure on quail preserves. Species that break up early nesting attempts of quail are especially destructive, as later broods, even if successful, are lower in numbers and less desirable. Seldom is control of hawks necessary except of the blue darters (Cooper's and sharp-shinned hawks). The killing of other hawks is poor policy as they prey significantly upon snakes that are habitual eaters of quail eggs. Wild turkeys destroy many eggs and chicks of quail and management areas for these two species should be separate. Snakes are kept in some check by paying bounties to tenants, and fire ants should be controlled where it can be economically done by the methods so far developed. The vermin killing attitude is not needed and does not prevail among quail managers.

Control: Pricklypear

Costello, David F. Pricklypear control on short-grass range in the Central Great Plains, U. S. Dept. Agr. Leaflet 210 (Supt. of Documents, Washington, D. C. 5 cents a copy), 6 pp., 3 figs., 1941.

Where control is, and is not, justified; discussion of methods as hand-grubbing, dragging with a railroad iron, and scraping with a road grader.

Control: Spatterdock

Smith, E. V., and H. S. Swingle. Control of spatterdock (Nuphar advena Ait.) in ponds, Trans. Amer. Fisheries Society, 1940 (Investment Bldg., Washington, D. C. $3.00 for the entire volume), pp. 363-368, 3 photos.

Authors' abstract: "Spatterdock (Nuphar advena Ait.) is an objectionable weed in southern ponds where its emergent leaves form a dense vegetation in which it is difficult or impossible to fish. Experiments dealing with the control of this plant were conducted in a pond in Central Alabama during the spring and summer, 1940. The results of these experiments are summarized briefly as follows: (1) Spatterdock was effectively controlled by cutting the leaves five times (May 15, June 4, June 21, July 2, and July 24); (2) four cuttings (June 4, June 21, July 2, and July 24) effectively controlled the plant when commercial fertilizer was applied on the first cutting date; (3) effective control was obtained by pulling the rootstocks on May 15, and allowing the plants to remain in the pond; (4) death and decay of the rootstocks of spatterdock began toward the base and progressed to the apex; (5) sprays consisting of mixtures of creosote and fuel oil, and sodium chlorate and sodium arsenite killed the leaves of spatterdock but did not injure the rootstocks."

Destruction: By a blizzard

Scott, Thomas G., and Thomas S. Baskett. Some effects of the 1940 Armistice Day storm on Iowa's wildlife, Iowa Bird Life (Winthrop, Iowa. 25 cents a copy), 11(2), June 1941, pp. 21-29, 3 pls.

"Among the most destructive blizzards within historic time was one that struck the north-central states on November 11, 1940 x x x considerable destruction of livestock, fruit trees, and wildlife was reported." Authors' summary: "(1) The storm of November 11 took a toll of wildlife in northwestern Iowa. On the Winnebago Area in north-central Iowa, the losses constituted less than 10 per cent of the pheasant population, but near Estherville, where the impact of the storm was more severe, losses were higher; (2) it appeared that the mortality of pheasants resulted from the sudden exposure of birds unaccustomed to a weather condition of mid-winter severity, and that the amount of mortality seemed closely related to the depth of snowfall and high wind velocity of which the latter was felt to have been of most consequence; (3) species other than pheasants which were found killed by the storm of November 11 were: Red-wings, Meadowlarks, Slate-colored Juncos, Tree Sparrows, Coots, domestic pigeons, cottontails, and a white-footed mouse; (4) birds and mammals killed by the storm constituted an important food-windfall to certain meat-eating species, a matter of considerable importance to the food habits investigator." Bibliography of 5 titles.

Destruction: Highway mortality

Hammond, Merrill C. Fall and winter mortality among Hungarian partridges in Bottineau and McHenry counties, North Dakota, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 375-382, 1 pl., 1 fig., 5 tables.

Author's abstract: "Fall and winter covey counts of Hungarian partridges (Perdix perdix) taken during 1938-39 and 1940-41 disclosed a loss of 22.2% and 30.1%, respectively, between brood season and February average covey sizes. Brood sizes averaged 1.25 birds per covey smaller in 1940 than in 1938, possibly due partly to greater rainfall during the summer of 1940. Highway mortality was found to be .93 and .92 birds per covey in 1938-39 and 1940-41, the loss being principally attributable to collision with automobiles, but partly to injuries caused by flight against elevated wires. The average size of fed coveys was not consistently larger than that of coveys subsisting on natural foods and waste grains, and it is believed that, in the area studied, winter feeding of partridges is not necessary to insure high winter survival under ordinary conditions. Development of natural food and cover and protection from nest predators are recommended for improving local partridge ranges."

Diseases and Parasites: Acanthocephala, Moniliformis

Chandler, Asa C. The specific status of Moniliformis (Acanthocephala) of Texas rats, and a review of the species of this genus in the western hemisphere, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 27(3), June 1941, pp. 241-244.

Discussion of characters, and review of the described species of which 4 are accepted for the western hemisphere. M. clarki infests Sciurus, Citellus, and Scalopus in mid-western States, and M. dubius, Rattus of the world. Bibliography of 14 titles.

Diseases and Parasites: Acarina, Boophilus

Travis, Bernard V. Examinations of wild animals for the cattle tick Boophilus annulatus microplus (Can.) in Florida, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 27(5), Oct. 1941, pp. 465-467, 1 table.

Wild birds and animals other than deer do not serve as hosts for cattle fever ticks. Nine kinds of ticks were recovered from hosts of 4 avian, and 9 mammalian, species; their occurrence is tabulated. Lists of mammals and birds upon which no ticks were found also are given. "Of the 22 deer examined (all from Orange County), 4, which were killed in a large cypress swamp, were infested with cattle ticks, the average infestation being 69, with a range from 3 to 182. The 18 deer on which there were no cattle ticks were taken from pine flat woods. This absence of cattle ticks on deer taken from the woods appears to be correlated with a program of ranging cattle over the tick-infested areas and dipping them at regular intervals. In the swampy areas it has not been possible to control ticks with such a cattle-dipping program, because the cattle do not move about freely in the dense swamps frequented by deer."

Diseases and Parasites: Acarina, Ornithodoros

Davis, Gordon E. Ornithodoros parkeri Cooley; observations on the biology of this tick, Journ. Parasitology, Lancaster, Pa. $1.50 a copy), 27(5), Oct. 1941, pp. 425-433, 6 tables.

Six species of mammals and the burrowing owl are noted as hosts; the known distribution includes 8 western States. Author's summary: "Data on the distribution, type areas, habitats, and natural and experimental hosts of the argasid tick, Ornithodoros parkeri, are given and observations on feeding habits, coxal fluid, longevity, copulation, molting, oviposition, cannibalism and its relation to relapsing fever, Rocky Mountain spotted fever, American Q fever and tularaemia are presented." Bibliography of 8 titles.

Diseases and Parasites: Acarina, Ornithodoros

McIver, Barbara C. A new species of Ornithodoros tick from Nevada (Acarina: Ixodoidea), Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 27(5), Oct. 1941, pp. 435-436, 1 pl.

O. cooleyi; no host mentioned.

Diseases and Parasites: Acarina, ticks of Ohio

Katz, Julius S. A collection of Ohio ticks and their hosts, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 27(5), Oct. 1941, pp. 467-468, 1 table.

Five species of ticks from 7 mammalian, and 3 avian, hosts; counties and dates recorded.

Diseases and Parasites: Blood parasites

Wetmore, Psyche W. Blood parasites of birds of the District of Columbia and Patuxent Research Refuge vicinity, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 27(5), Oct. 1941, pp. 379-393, 2 tables.

They were found in 30 percent of 618 birds examined. Four named genera besides plasmodia and microfilaria were represented. The occurrence of each is summarized and measurements and details of occurrence tabulated. Bibliography of 15 titles.

Diseases and Parasites: Botulism

Mays, Alfred S. Observations on duck disease at Tulare Lake Basin, 1940, California Fish and Game (Terminal Island, Calif.), 27(3), July 1941, pp. 154-163, figs. 38-45.

Description of conditions at Tulare Lake that are favorable to the development of Clostridium botulinum, type C, of symptoms of the malady, and of control measures that were adopted. Of 5,437 waterfowl treated in 1940,

4,152 recovered. Popular fancies as to the cause of duck sickness are commented upon and suggestions made for further research.

Diseases and Parasites: Brucellosis

Katz, Julius S. Brucellosis in wildlife, Journ. Amer. Veterinary Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 99(772), July 1941, pp. 24-27.

Abstract of the literature, 20 titles being cited. The bison, elk, moose, brown rat, pheasant, and turkey are definitely susceptible to the disease.

Diseases and Parasites: Encephalomyelitis

Cox, Herald R., M. L. Jellison, and L. E. Hughes. Isolation of western equine encephalomyelitis virus from a naturally infected prairie chicken, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 56(39), Sept. 26, 1941, pp. 1905-1906.

Rugby, North Dakota, where a human epidemic was in progress. Notes on the tests made and references to previous isolations of the virus from birds.

Diseases and Parasites: Lymphadenitis

Choatum, E. L. Lymphadenitis in New York cottontails, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 304-308, 1 pl., 1 table.

Author's abstract: "An infection of the lymph system is described and the distribution of necrotic foci tabulated. Stages of infection varied from involvement of a single mandibular node to heavy swelling and necrosis of mandibular, axillary, and lumbar nodes, with occasional metastasis to the heart, lungs, and spleen. The causative organisms identified as a strain of Staphylococcus aureus. Skin injuries were probable avenues of infection and the possibility of ticks being involved is noted. In one locality incidence of the disease was 16.6%; it is apparently highest during late winter and early spring. To date field and laboratory experience does not indicate intrinsic fatality to cottontails but since moribund rabbits are probably inaccessible to the collector, it is difficult to appraise the disease as a mortality factor in the wild."

Diseases and Parasites: Lymphadenitis

Soghotti, Leo, and Frank D. McKenney. Caseous lymphadenitis of deer (Odocoileus hemionus) in Washington, Journ. Amer. Veterinary Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 98(767), Feb. 1941, pp. 129-131.

Confusion as to this malady; description of lesions; laboratory studies. Apparently the disease is a common one of deer in the Pacific Northwest. Authors' summary: "Corynebacterium ovis was isolated from characteristic abscesses in four deer (Odocoileus hemionus). The etiology of the organism is identical with that of the organism that causes caseous lymphadenitis in sheep. A cultural study of this organism, with symptoms and lesions produced in experimental animals, is important to differentiate the disease from other suppurative processes."

Diseases and Parasites: Mallophaga, Esthiopterum

Wilson, Francis H. The slender lice of American pigeons and doves with descriptions of two new species, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 27(3), June 1941, pp. 259-264, 10 figs.

Esthiopterum passerinae n. sp., from the ground dove, Alabama; and E. macrourae n. sp., from the mourning dove, Louisiana; description, illustration; discussion of related species; bibliography of 7 titles.

Diseases and Parasites: Nematoda, Crenosoma

Hobmaier, M. Description and extramammalian life of Crenosoma mephitidis n. sp. (Nematoda) in skunks, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 27(3), June 1941, pp. 229-232, 1 pl.

Original description, California; illustrations; development of larvae in water; Pacific garter snake an auxiliary host.

Diseases and Parasites: Nematoda, Crenosoma

Hobmaier, M. Newer aspects of the lungworm (Crenosoma) in foxes, Amer. Journ. Veterinary Research (600 S. Michigan Ave., Chicago, Ill. $1.25 a copy), 2(4), July 1941, pp. 352-354.

Reports on the results of experimentally infecting foxes and dogs with C. mephitidis. This species and C. vulpis are very similar, morphologically and biologically; both have snails and slugs as intermediate hosts and slug-eating reptiles (garter snakes) as auxiliary hosts. Effective control requires removals of both of these sources of infection.

Diseases and Parasites: Nematoda, Foleyella

Kotcher, Emil. Studies on the development of frog filariae, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 per section), 34(2), Sept. 1941, Section D, pp. 36-58.

A microfilaria is an embryo in suspended development, that can pass through minute channels and penetrate tissues. The comparative sizes of 11 species of 8 genera are tabulated as well as measurements and the positions of certain structures of 3 species of Foleyella. The life histories of these species are detailed and compared with those reported for other forms. 2-1/2 page bibliography.

Diseases and Parasites: Nematoda, Syngamus

Ripple, Richard C. Studies on the gapeworm Syngamus trachea (Montagu, 1811) in robins and chickens, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 27(5), Oct. 1941, pp. 369-374.

Author's summary: "(1) Morphologically the robin gapeworm could not be distinguished from S. trachea of domestic poultry. Therefore, Syngamus temnispiculum Manter and Pinto, 1928, is considered to be a synonym of Syngamus trachea; (2) several attempts to infect chickens with recently incubated eggs from the robin gapeworm were unsuccessful; (3) earthworms (Eisenia foetida) fed incubated eggs of the robin gapeworm produced an infection in one of six chickens; (4) eggs of the robin gapeworm kept in cold storage for six months, then incubated and fed in large numbers resulted in infections in two of six chickens; (5) cross-infection experiments, therefore, confirm the identity of the robin and chicken gapeworms. However, because of the difficulty of cross-infection it is by no means certain that such transfers occur in nature." Bibliography of 12 titles.

Diseases and Parasites: Paratyphoid

Cunningham, Charles H. Paratyphoid infection in quail, Journ. Amer. Veterinary Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 99(774), Sept. 1941, p. 217.

High mortality in chicks 3 to 9 days old ascribed to infections of Salmonella bredeney although Escherichia communis and E. communior also were isolated from some of the birds. Losses after release on a game preserve were negligible.

Diseases and Parasites: Paratyphoid

Gauger, H. C., and Seth Gordon, Jr. Paratyphoid in a fawn, Journ. Amer. Veterinary Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 99(772), July 1941, p. 54.

Symptoms, lesions, serological identification of the causative organism as Salmonella derby. North Carolina.

Diseases and Parasites: Plague, flea surveys

Stewart, M. A., and F. C. Evans. A comparative study of rodent and burrow flea populations, Proc. Soc. for Experimental Biol. and Medicine (Utica, N. Y. $1.00 a copy), 47(1), May 1941, pp. 140-142, 2 figs.

Citellus beecheyi, California. The flea population density and species composition at the mouths of burrows reflects with a high degree of accuracy, but on a smaller magnitude, those on the host. It is feasible, therefore, to make flea surveys by collecting specimens at burrow openings, provided variations in the seasonal incidence of species be taken into account.

Diseases and Parasites: Plague, spread of, in ground squirrels

Evans, F. C., and R. Holdenried. Field study of ground squirrel (Citellus beecheyi) in relation to sylvatic plague, Proc. Soc. for Experimental Biol. and Medicine (Utica, N. Y. $1.00 a copy), 47(1), May 1941, pp. 63-64, 1 fig.

California. Notes on growth of young and cruising radius of the squirrels. Ninety percent were never caught outside of ranges 300 yards in diameter and 70 percent remained within areas of not more than 100 yards in diameter; greatest distance moved, 1,300 yards. Changes in numbers are described and graphed; there was a steady reduction in both young and adults from the peak populations of early summer. In October more than 80 percent were young of the year. In view of the essentially sedentary character of the animals, the authors conclude that the spread of plague has been by contact between individuals in a continuous population.

Diseases and Parasites: Protozoa, Eimeria

Waller, E. F., and B. B. Morgan. The pathology of Eimeria leporis (Coccidia) in the cottontail rabbit, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 per section), 34(2), Sept. 1941, Section C, pp. 83-85, 3 figs.

This parasite first described from Lepus timidus in Holland is recorded from Wisconsin, and the lesions caused by it described and illustrated.

Diseases and Parasites: Protozoa, Haemoproteus

Roudabush, Robert L. Gametogenesis of Haemoproteus beckeri in the blood of the brown thrasher (Toxostoma rufum), Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 per section), 34(2), Sept. 1941, Section C, pp. 126-127.

Example of gametogenesis and zygote formation in a vertebrate host of this parasite. Iowa.

Diseases and Parasites: Protozoa, Hexamita

McNeil, E., W. R. Hinshaw, and C. A. Kofoid. Hexamita meleagridis sp. nov. from the turkey, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 per section), 34(2), Sept. 1941, Section C, pp. 71-82, 2 figs.

Review of the occurrence of the genus in various vertebrates and of publications upon them (4-page bibliography); check-list of the species and their hosts; original description and illustration of the form named; account of cross-infection experiments; the organism causes severe catarrhal enteritis.

Diseases and Parasites: Protozoa, Sarcosporidia

Beaudette, F. R. Sarcosporidiosis in a black duck, Journ. Amer. Veterinary Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 99(772), July 1941, pp. 52-53.

List of 20 species of wild birds in which this parasitism has been reported. It is probably very widespread.

Diseases and Parasites: Protozoa, Toxoplasma

Mov. Manwell, Reginald D. Avian toxoplasmosis with invasion of the erythrocytes, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 27(3), June 1941, pp. 245-251, 1 pl.

Review of information about the genus and account of an infection observed in a young English sparrow. Bibliography of 10 titles.

Diseases and Parasites: Protozoa, Trichomonas

Stabler, Robert M. Further studies in trichomoniasis in birds, Auk (Rudyard Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 58(4), Oct. 1941, pp. 558-562, 1 table.

Rock doves, essentially wild, exhibited a high rate of infection; two nestling duck hawks were found naturally infected; and individuals of several species proved readily susceptible to Trichomonas gallinae. The results of examination of numerous other birds (listed) were negative.

Diseases and Parasites: Trematoda, Cathaemasia

Zeliff, C. Courson. Observations on Cathaemasia reticulata, a trematode from the belted kingfisher, Amer. Naturalist (Science Press, Lancaster, Pa. $1.00 a copy), 75(760), Sept.-Oct. 1941, pp. 508-512, 2 figs., 1 table.

Pennsylvania. Comparison with previous descriptions; synonymy; notes on related forms; illustrations. Bibliography of 6 titles.

Diseases and Parasites: Trematoda, Prosthogonimus

Macy, Ralph W. Further studies on Prosthogonimus macrorchis, oviduct fluke of poultry, with special reference to the effect on egg production in the ring-necked pheasant, Proc. Minnesota Acad. Sci. (H. K. Wilson, Sec'y.-Treas., University Farm, St. Paul, Minn.), 8, 1940, pp. 39-41, 1 fig.

Review of pertinent literature (11 titles cited). Report on experimental work, the findings of which are the reverse of those reported by Gower (see WILDLIFE REVIEW, No. 26, Feb. 1940, p. 13). This author concludes, "that ring-necked pheasants are fully as susceptible to infection with Prosthogonimus

macrorchis as the chicken, and that egg laying is greatly reduced by the presence of this parasite in the oviduct."

Diseases and Parasites: Ulcerative enteritis

Bass, C. C. Quail disease--some of the important facts about it, Louisiana Conservation Review (La. Dept. of Conservation, 126 Civil Courts Bldg., New Orleans), Summer 1941, pp. 11-14, 4 photos (one a portrait of the author.

Ulcerative enteritis or quail disease causes greater losses of quail in captivity than does any other malady. Directions are given for dissecting specimens and recognizing the lesions (figured). Symptoms are described but they are not especially characteristic of this disease. Birds infected either experimentally or by contact with diseased fellows die at periods varying from 36 hours to several weeks. Recovery is rare. The causative organism is a "Gram-negative, anaerobic, nonspore bearing bacillus," and vaccine made from it immunizes quail to otherwise infectious doses of living cultures. Quarantining new stock, using half-inch wire mesh for cage floors, and feeding and watering from containers outside of the pens are recommended as preventive measures.

Diseases and Parasites: Ulcerative enteritis

Durant, A. J., and E. R. Doll. Ulverative enteritis in quail, Missouri Agr. Expt. Sta. (Columbia, Mo.) Research Bul. 325, 27 pp., 7 figs., 2 tables, 1941.

The disease has been reported in the bob-white and in the California, mountain, and Gambel's quails, in chukar and Hungarian partridges, the sharp-tailed grouse, the wild turkey, and domestic fowl. It is highly infective and destructive. This bulletin reviews the literature (of which 13 titles are cited), describes materials and methods of the authors' study, the symptoms, gross- and histo-pathology, and bacteriology of the malady, reports experiments in transmitting it to other species, discusses the rate of mortality in quail, and summarizes the results of the investigation. The causative factor was not determined but was suspected to be bacterial.

Diseases and Parasites: Of birds

Quortrup, E. R., and J. E. Shillinger. 3,000 wild bird autopsies on western lake areas, Journ. Amer. Veterinary Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 99(776), Nov. 1941, pp. 382-387, 4 photos, tables.

Botulism led among identified causes of death with 47.9 percent of the cases; mechanical injury including shot wounds was next, with 18.5 percent. Lesions and seasonal distribution of botulism are discussed and a list of 38 affected species given. Similar reference to lead poisoning includes a list of 15 species of waterfowl victims. Parasites, seldom a primary cause of death, were found in 3.3 percent of the birds examined; they are listed according to

hosts. Sarcosporidiosis, pneumonia, aspergillosis, tuberculosis, and amoebic dysentery also are reported upon.

Ecology: Beaver dam altering stream insect fauna

Sprules, Wm. W. The effect of a beaver dam on the insect fauna of a trout stream, Trans. Amer. Fisheries Society 1940 (Investment Bldg., Washington, D. C. $3.00 for the entire volume), pp. 236-248, 2 figs., 2 tables.

Author's abstract: "A qualitative and quantitative investigation of the distribution of aquatic insects in Mid Creek, Algonquin Park, Ontario, has been carried out during the summer months of the last 3 years. Samples of the population present were obtained by trapping the insects which emerged from 1 square yard of water surface. In the first season the field station described in this report was characterized by a rubble bottom and rapid flow of water. These conditions remained unaltered during the first part of the second season and the insect emergence for this period corresponded closely with that of the previous year. In early July, however, beavers constructed a dam across the stream flooding the riffle section which was under observation. The number of insects emerging immediately decreased as species dependent on a lotic environment were destroyed or forced to migrate. A few species were able to tolerate the new ecological conditions while a numerically small group of species typically found in quiet water entered the area. In the third season the lentic nature of the habitat was continued and the change in the fauna was more complete since the total population approximated that of a slow-flowing, silted stretch of the stream."

Ecology: Census methods, big game

Bach, Roy N. Some remarks concerning the North Dakota big game survey, North Dakota Outdoors (State Fish and Game Dept., Bismarck, N. Dak. 5 cents a copy), 3(12), June 1941, pp. 18-22, 3 photos, 4 maps.

By airplane observation; technique and results; the maps show ranges of white-tailed and mule deer, and antelope as revealed by the survey. In an introductory statement the Editor (Arnold Strand) comments on the defects in other methods and in the results obtained, which are stated for comparison with those of the airplane reconnaisance. The cost was less than 10 cents per square mile for the territory covered.

Ecology: Census methods, deer

Krefting, Laurits W., and Jack B. Fletcher. Notes on the cruising method of censusing white-tailed deer in Oklahoma, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 412-415.

Authors' abstract: "The method employed for censusing white-tailed deer in southeastern Oklahoma was based on the cruising system, first developed by Arnold B. Erickson in St. Croix State Park, Minnesota. Representative

sample areas four square miles in size were chosen and the census lines were run at one-half mile intervals by the two census takers. Two areas were covered in a day, one in the early morning and the other in the late afternoon. A box compass was used to determine course of direction, and pacing to measure distance traversed. The techniques employed to increase the accuracy of the method were choice of proper weather conditions and manner of covering census lines. The best practice was to proceed slowly in 'hunting fashion,' in other words to stalk the deer along the census route just as a hunter might do. The estimate of 3,125 white-tailed deer on 3,500 square miles of range in southeastern Oklahoma for March 1940 is believed to be close to the actual number of the population."

Ecology: Census methods, mammals

Dice, Lee R. Methods for estimating populations of mammals, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 398-407.

Author's abstract: "Counts of the number of wild mammals in a population are usually difficult or impossible to make because the animals are highly mobile, most of them are shy, and many are nocturnal in habit. The estimates of mammalian populations that have been made up to the present time are mostly based on inadequate data and accordingly very few of them are at all accurate. Most of the field methods in use need further refinement and standardization before they will yield satisfactory data in adequate quantity for statistical treatment. For a few kinds of mammals there have been developed indices of abundance that are easier to obtain than are complete censuses, but which for certain practical purposes are nearly as useful."

Ecology: Census methods, valley quail

Glading, Ben. Valley quail census methods and populations at the San Joaquin experimental range, California Fish and Game (Terminal Island, Calif.), 27(2), April 1941, pp. 33-38, figs. 24-26, 1 table.

Description of a method of strip-counting by men on horseback that is suitable for chiefly open country. Three riders can count the birds on 750 acres during an eight-hour day. Sample results are expressed in map, table, and graph.

Ecology: Census methods, water plants

Siegler, Hilbert R. A water plant census technique, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 423-426, 5 figs.

Author's abstract: "Linear and transect counts made by pacing the shore line and the width of plant communities, are used to establish the ratios of abundance of water plants in small lakes and marshes. Four major differences in plant communities or formations are recognized and illustrated. Each type of plant formation requires a slight modification of the linear and

transect counts. On lakes in which the band of vegetation around the shore line is of fairly uniform width, merely pacing along the shore line and counting 'one' every time the plant species under consideration occurs opposite the foot is sufficient. On a lake with irregular growths of vegetation along the shore line, the linear (shore line) count is supplemented by transect counts through the width of the plant formations. Linear and transect counts are made on lakes and marshes in which several species of plants grow uniformly over the entire area. Where sample counts rather than counts over the entire lake are made, these must be of equal length. On marshes or lakes where the general plant growth is interspersed by patches of different species, linear and transect counts are used, but the transects must run through the patches of mixed growth."

Ecology: Cover mapping

Sandoz, O'Reilly, and L. G. Duck. The development and application of a wildlife food and cover classification in Oklahoma, Pittman-Robertson Quarterly (U. S. Fish and Wildlife Service, Washington, D. C.), 1(2), April 1941, pp. 106-119, 3 photos, 1 map, 2 tables.

A generalized ecological map of Woodward County is presented, and the principal plants and animals of the various associations commented upon in descriptive text. "Management of environmental improvement of game habitat is greatly facilitated by the use of such a type map." Recommendations can be made for any specific area and the range suitable for a given species quickly determined.

Ecology: Kaibab Plateau

Rasmussen, D. Irvin. Biotic communities of Kaibab Plateau, Arizona, Ecological Monographs (Duke University, Durham, N. C. $1.50 a copy), 11(3), July 1941, pp. 230-275, 20 figs., 3 tables.

This discussion takes most account of mammals, birds, and woody plants, but deals more or less extensively also with other groups. A general description and history and a map of the area are presented. There is full discussion of the increase and decrease of the Kaibab deer herd, and a section on extirpated and introduced mammals. The general treatment is by ecological associations and there is a summary, a bibliography of 42 titles, and lists of vertebrates and plants, and of a few insects. An excellent paper, throwing a clear light upon one of the most celebrated and aggravated instances of oscillation of a deer population.

Ecology: Overpopulations ✓

Ratcliff, Harold M. Winter range conditions in Rocky Mountain National Park, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 132-139, 3 tables.

Vegetation in the Rocky Mountain National Park in Colorado has steadily declined since 1931. Browse plants are being so heavily utilized by deer and elk that many have been destroyed and others are now threatened. Herbs have been damaged less than woody plants but the number of weeds is increasing. Conifers and aspens show definite browse lines. This over-utilization cannot be allowed to continue if the range is to be saved and restored. Reduction in numbers of the herbivores must occur either by natural or artificial processes. "The gravest need at present is for legal authority to dispose of surplus animals."

Ecology: Populations, bird

Hickey, Joseph J. Audubon Magazine's fifth breeding-bird census, Audubon Magazine (National Audubon Society, 1006 Fifth Ave., New York, N. Y. This section only, 20 cents a copy), 43(5), Sept.-Oct. 1941, Section II, pp. 480-500.

Report on 40 tracts, averaging 38 acres in size, well distributed over the U. S., and representing very diverse habitats. Data for these areas cover from 1 to 4 years, list the species, show totals of species, and pairs, and density of pairs per 100 acres.

Ecology: Populations, bob-white

Errington, Paul L. An eight-winter study of central Iowa bob-whites, Wilson Bulletin (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 53(2), June 1941, pp. 85-102, 4 tables.

Discussion and tabulation of wintering densities, the usual stability, irregular fluctuation, and the question of periodicity in abundance of bob-white populations; also competition with the ring-necked pheasant. Author's summary: "An eight year (1932-40) field study of central Iowa Bob-white populations not only began and ended with abundance peaks but also covered an interval of pronounced scarcity. Practically all of the traceable mortality associated with the decline took place during the winters of 1934-35 and 1935-36 and most of this proved to be of the familiar starvation-emergency types that may be expected on a greater or less scale nearly any winter; an inexplicably low rate of recovery of Bob-whites among other wild species during the breeding season of 1936, however, may suggest the operation of unknown factors, perhaps of periodic nature. Occupancy of given tracts of environment is evidently determined by the sociality of the birds as well as by food and cover conditions; and this is illustrated by Bob-White responses to crowding either on the part of their own or some other species as the Ring-necked Pheasant, by their occasional late-winter adaptiveness in establishing themselves in food-rich fields away from the bushy fence rows, woodlots, gullies, and water courses usually frequented, and by their apparent maintenance--despite annual changes in habitats and in covey composition--of coloration 'traditions' peculiar to the most regularly used winter territories." Bibliography of 24 titles.

Ecology: Rodent damage

Parker, Lansing A. Factors causing rodent damage to tree plantations in southeastern Minnesota, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 297-303, 5 tables.

Author's abstract: "Tree plantations, for erosion control in southeastern Minnesota, suffered about 47 per cent damage by rodents during the winter of 1938-39. Stem damage, assumed to be caused by mice, affected 36.6 per cent and attacks to the tops, probably by rabbits, 15.3 per cent of the trees. The amount of damage varied only slightly with location and age of the plantations (1-4 years old). Definite species preferences were noted; mice attacked more than 60 per cent of the wild plums, Chinese elms, and soft maples. Rose, hackberry, and green ash were most severely damaged by rabbits. Certain characteristics of the site apparently favored injury. Ideal conditions for mice seemed to be found on areas having a north exposure, formerly in cultivation, with heavy grass cover. Rabbits preferred idle areas with thin vegetation and any slope. The limited data for areas that were furrowed by plowing indicated greater damage to the trees there than on those prepared for planting by hand."

Ecology: Small birds, Arizona

Monson, Gale. The effect of revegetation on the small bird population in Arizona, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 395-397, 1 fig., 1 table.

Author's abstract: "A census of small birds on a controlled grazing area and an adjacent uncontrolled area on the Navajo Indian Reservation revealed more than twice as many birds on the former as on the latter, apparently a result of the increase in cover and food on the former area."

Ecology: Web of life

Hathaway, Edward S. Conservation and the web of life, Louisiana Conservation Review (Dept. of Conservation, 126 Civil Courts Bldg., New Orleans, La.), Spring 1941, pp. 24-26, 2 photos.

Definition of the web of life and discussion of what happens when we tamper with it, illustrated by examples. A rational program in conservation should be based on ecological principles. Bibliography of 6 titles.

Economics: Beaver

McCann, Lester. Beaver as an economic asset, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 2(12), Sept. 1941, pp. 9-11.

In 1939 the season was open for the first time for forty years. Between 7 and 8 thousand animals were caught. Trapping is described and regulations governing it explained. The value of the catch probably amounts to upwards of $200,000 for the year.

Education: Bird study

Deck, Raymond S. Pageant in the sky. A book of the modern sport of bird-watching (Dodd, Mead & Co., 432 Fourth Ave., New York, N. Y. $3.00 a copy), xiv+268 pp., numerous photographs, 1941.

An interestingly written account of personal experiences with birds by one who is neither all sportsman or all ornithologist, illustrated by photographs of his own taking. Not for the expert or critical ornithologist but it will doubtless convert to bird-watching many a lay reader.

Education: Bird study

Pettingill, Olin S. Bird walks the year around, Biology Briefs (Denoyer-Geppert Co., 5235 Ravenswood Ave., Chicago, Ill.), 4(3), Oct. 1941, pp. 18-20, 3 photos.

Suggestions as to the purpose of bird walks, equipment used, general plans, and what to look for at various seasons.

Education: Conservation

Dahlberg, E. M. Conservation of renewable resources (C. C. Nelson Publishing Co., Appleton, Wisc. $1.00 a copy), ix+217 pp., illus., 1939.

Prepared as a text for schools in Wisconsin, one of the States in which the teaching of conservation is required by law, the book has 5 chapters devoted to animal, 10 to plant, and 1 each to soil, historical, recreational, and human, resources. Author's conclusion: "With the principles of conservation being taught in the public schools it is probable that an ever increasing number of boys and girls will grow up to be champions and defenders of the persecuted and vanishing species of wild plant and animal life. Then the trees and shrubs and wild flowers and the wild animal life of America will soon cease to be objects of perennial pursuit and exploitation, and this western civilization will find a way to substitute a sane and orderly conservation of its natural resources for the prodigal and greedy exploitation that has characterized the past."

Education: Conservation

Elliott, Charles N. Conservation of American Resources (Turner E. Smith & Co., Atlanta, Ga. $1.80 a copy), xi+672 pp., illus., 1940.

The chapter heads are: Steps toward conservation, game birds, game animals, fish, forests, nature's masterpieces, land, water, minerals, animal and plant life, landscape, and planned conservation. Each section of the book

is accompanied by suggestions for study and activities. An appendix includes a glossary of conservation words, a ten-page bibliography, and lists of conservation agencies and organizations. Scattered through the text are messages from 50 leading conservationists (of each of which a portrait is presented).

Education: Conservation

Martin, Charles F., and Lou A. Shepherd. Conservation and the school (Klipto Loose Leaf Co., Mason City, Iowa. 60 cents a copy), 105 pp., illus., 1941.

"The authors' aim is to aid teachers in making conservation a vital part of school living. Certain conservation activities, therefore, are suggested and explained, and the relationships are shown to the commonly arranged school program involving the skill and content subjects. It is hoped by this means to install democratic living by guiding children to work democratically in groups and to develop respect for land and wildlife through practicing conservation of wildlife which includes conservation of soil." School and community resources, background of conservation of natural resources, and conservation of wildlife as part of school living, are the subjects of the principal chapters. The last is much subdivided and suggests activities for creating, constructing, developing attitudes of service, investigating, appreciating, and developing desirable social attitudes. A characteristic of the book is casting ordinary school tasks in wildlife terms. Three and one-half page bibliography.

Education: Conservation ✓

Onslow, Walton, Charles E. Randall, Howard Zahniser, George Barnes, George Lundy, Shannon Allen, Nash Buckingham, Dave Roberts, Ray Osborne, et al. Conservation education and publicity, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 85-108.

Subjects treated by the speakers included: The conservation activities of the U. S. Department of the Interior, and the ways in which information about them is disseminated; U. S. Forest Service interpretation of the principles of sustained yield, multiple use, and highest use, "for the greatest good to the greatest number of people in the long run"; objectives of publicity in the Fish and Wildlife Service and the necessity of employing personnel of specialized training to carry it on; in the Soil Conservation Service conservation is regarded as a process of use and education about it employs mass communication methods; publicity as handled by the National Wildlife Federation; the preservation, cataloguing, and exchanging of radio scripts; unification of sportsmen's interests and efforts; better training of wildlife writers and use of their opportunities to guide public opinion toward sound conclusions; and conservation education by the states.

Discussion following the arranged program is reported on pp. 108-117.

Food Habits: Browse, white-tailed deer ✓

Dalke, Paul D. The use and availability of the more common winter deer browse plants in the Missouri Ozarks, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 155-160, 5 tables.

Plants of at least 200 species are fed upon by white-tailed deer in this region. Utilization of the more important kinds is discussed and for the winter season, tabulated. The extent of utilization was determined by a clipping study, the results of which are described and summarized in tables for oak-hickory woodland and ravines and roadsides. The yield of browse per acre was also calculated and tabulated. From author's summary: "The deer have nowhere reached populations detrimental to the most palatable woody perennials, forbs, or grasses on the unrestricted range. Various degrees of over-browsing have been demonstrated, however, on one private game preserve. Here exclosure plots are indicating the rate and ability of certain species in recovering from prolonged over-browsing. Greenbrier (Smilax spp.) has demonstrated a remarkable comeback. The greatest amount of browsing upon the stems of woody perennials occurs during the latter part of December, and in January and February. The low-bush blueberry, coralberry, aromatic sumac, New Jersey tea, and greenbrier have proved to be highly palatable throughout the winter. Bluegrass, orchard grass, and several species of panic grasses are heartily utilized. The rosettes of such perennial forbs as the coneflowers and asters are eaten throughout the winter period."

Food Habits: Browse, white-tailed deer

Petrides, George A. Observations on the relative importance of winter deer browse species in central New York, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 416-422, 2 tables.

Author's abstract: "Notes regarding 42 species of woody plants and 2,089 individual browsings upon them by northern white-tailed deer (Odocoileus virginianus borealis) were accumulated on the Connecticut Hill State Game Refuge near Ithaca, New York, during the winters of 1938-39 and 1939-40. Red maple (Acer rubrum), sugar maple (A. saccharum), staghorn sumac (Rhus typhina), and witch-hazel (Hamamelis virginiana) were considered to be of greatest importance, 46.5% of the total browsings recorded being of these species. Large-toothed aspen (Populus grandidentata), quaking aspen (P. tremuloides), birch (Betula), oak (Quercus), round-leaved dogwood (Cornus rugosa), and striped maple (Acer pennsylvanicum) were of 'medium' quality and comprised 30.3% of the total, while eleven species of 'fair' importance and 21 of 'slight' value formed 17.4% and 5.2%, respectively, of the browse noted as consumed. Round-leaved dogwood, staghorn sumac, flowering dogwood (Cornus florida), and basswood (Tilia americana) were the principal preferred species, while red maple, sugar maple, striped maple, witch-hazel, oak, and birch comprised the more important staple foods. The principal emergency foods appeared to be hemlock (Tsuga canadensis), white pine (Pinus strobus), red pine (P. resinosus), Scotch pine (P. sylvestris), and beech (Fagus grandifolia). Of

the total browsing recorded, preferred foods formed 21.8%; staples, 61.1%; emergency, 14.5%; and miscellaneous, 2.6%.

Food Habits: Elk browsing

Gaffney, William S. The effects of winter elk browsing, South Fork of the Flathead River, Montana, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 427-453, 4 pls., 1 fig., 3 tables.

Author's abstract: "A detailed discussion of the environmental conditions on the winter range of an estimated 2,600 elk on the upper South Fork of the Flathead River, Montana. With a summer range of about 420,000 acres, the elk are confined to a winter range of not more than 70,000 acres, of which about 20,000 acres are in a seriously overbrowsed condition. New growth is greatly reduced, and in some instances, almost completely checked on the preferred browse species: willow (Salix), dogwood (Cornus stolonifera), chokecherry (Prunus demissa), serviceberry (Amelanchier alnifolia), mountain maple (Acer glabrum), aspen (Populus tremuloides), and cottonwood (Populus trichocarpa). An increased density of the non-palatable shrubs, such as buffaloberry (Lepargyrea canadensis), cinquefoil (Dasiphora fruticosa), alder buckthorn (Rhamnus alnifolia), and alder (Alnus tenuifolia) is not yet evident, but is anticipated in view of the reduction in volume of the more palatable shrubs. Conifers have been damaged by browsing in some localities. Grass forage has been depleted, but is partly protected by deep snows in the winter. As a result of the overbrowsing, there have already been severe losses in the elk herd, and it is believed that the stock is being degraded through the effects of insufficient winter food. A table lists 78 of the plants on the winter range according to abundance and palatability."

Food Habits: Nutritional analyses

Voris, LeRoy, Lawson F. Marcy, Edward J. Thacker, and Walter W. Wainio. Digestible nutrients of feeding stuffs of the domestic rabbit, Journ. Agr. Research (Supt. of Documents, Washington, D. C. 15 cents a copy), 61(9), Nov. 1940, pp. 673-683, 7 tables.

Analyses of 47 feed stuffs, including some of interest in connection with wildlife management, as alfalfa, Lespedeza sericea, and buckwheat. Bibliography of 8 titles.

Food Habits: Nutritional analyses

Wainio, Walter W., and E. B. Forbes. The chemical composition of forest fruits and nuts from Pennsylvania, Journ. Agr. Research (Supt. of Documents, Washington, D. C. 15 cents a copy), 62(10), May 15, 1941, pp. 627-635, 3 tables.

Percentage analyses of samples of 25 species of fruits and 10 of nuts; discussion of methods and results. Bibliography of 7 titles.

Food Habits: Toxicity of Crotalaria

Nestler, R. B., and W. W. Bailey. The toxicity of Crotalaria spectabilis seeds for quail, Journ. Wildlife Management (Frank C. Edminster (Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 309-313, 3 tables.

Authors' abstract: "The seeds of Crotalaria spectabilis are poisonous to bobwhites. Under ordinary conditions, however, they are not eaten by the birds when there is a choice of feeding stuffs. In fact some individuals starve rather than eat them. If a few seeds of C. spectabilis are picked up accidentally, or otherwise, by the quail, there is a good possibility that they will be evacuated from the bowels undigested, and so do little harm."

Food Habits: Utilization of Caprifoliaceae

Wade, Dorothy R., and Douglas E. Preliminary reports on the flora of Wisconsin. XXVIII. Caprifoliaceae, Trans. Wisc. Acad. Sci. Arts and Letters (Madison), 32, 1940 (1941), pp. 91-101, 18 maps.

Notes on distribution of the various species in the State (also indicated on the maps) and on their value in providing cover and food for wildlife. References to papers of 16 authors on food of wildlife.

Food Habits: Of coyote ✓

Horn, E. E. Some coyote-wildlife relationships, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 283-286.

Arguments for and against coyote control and account of studies of food habits and ecologic relationships of coyotes in California that are still in progress. Author's conclusions: "Study of scats and stomachs from Santa Barbara County, California, showed that deer constituted a large part of the diet of coyotes. Removal of these predators from 160 square miles has been followed by increased survival of fawns, and by a decrease in rabbits and rodents. Coyotes in the foothills of Madera and Fresno Counties feed principally on squirrels and other rodents. Deer are not present. Rodents and rabbits decreased after removal of coyotes, and some species are again increasing. These studies indicate that coyotes play a measurable part in regulating the numbers of deer, but do not control the rodent-rabbit populations. Increased research on specific ecological units is essential to develop management plans that include predator control."

Food Habits: Of coyote

Sperry, Charles C. Food habits of the coyote, U. S. Dept. of the Interior, Wildlife Research Bul. 4 (Supt. of Documents, Washington, D. C. 20 cents a copy), iv+70 pp., 3 pls. (1 col.), 3 figs., tables.

A map indicates the regularly occupied range and sporadic occurrences of the coyote. This comprehensive investigation is based upon examination of more than 8,000 stomachs, adequately representing the range of the animal and the seasons of the year. The results are presented primarily by volume, but also by frequency, percentages. Their distribution by major groups was as follows:

Food item	Percentage of volume	Percentage of frequency of occurrence
Rabbits	33	43
Carrion	25	35
Rodents	18	32
Livestock	13.5	20
Other animal matter	8.5	30
Vegetable matter	2	6

In summary, the taking of 80 percent of the coyote's food is of neutral or of useful, and of 20 percent of harmful, significance to man. It has been customary in economic studies to give approval to species with such a record. This instance shows, however, that the nature of a specific part of the food, even of relatively low percentage, must be carefully analyzed to appraise correctly the relation of the animal's feeding habits to man. As has been pointed out before, percentages do not tell the whole story but interpretation is paramount.

All elements of the coyote's subsistence are carefully discussed, and the paper has a summary, an abstract, and a 4-page bibliography. This satisfactory bulletin is the fruition of a plan for a coyote food habits study for which the Denver sublaboratory was primarily established. The amount of effort that has gone into the collection and examination of material and into preparation of the report is so vast that probably even those who made it can hardly estimate its extent. It gives full confidence, however, in the worth of the findings.

Food Habits: Of deer, white-tailed

Atwood, Earl L. White-tailed deer foods of the United States, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 314-332, 1 fig.

Author's abstract: "A compilation of published and unpublished foods of the following sub-species: Odocoileus v. virginianus, O. v. borealis, O. v. macrourus, and O. couesi. The list includes 516 species from 93 plant families including more than 200 species identified by the author in Missouri and not previously published. General palatabilities are indicated by the relative number of times each species has been recorded."

Food Habits: Of deer, white-tailed

Waugh, Fran. So I began analyzing deer stomachs, South Dakota Conservation Digest (South Dakota Game and Fish Dept., Pierre), June 1941, pp. 7-8, 1 fig.

Notes on food species of Black Hills deer identified in field observation and stomach examination. Leading items were kinnikinnick, tree moss, serviceberry, chokecherry, snowberry, rose hips, juniper, Oregon grape, everlasting, and ceanothus.

Food Habits: Of ducks

Morse, Marius. Duck foods and hunting takes, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 2(10), July 1941, pp. 34-36.

Notes based on examination of 437 duck gizzards, mostly on the groups of plants that are of little, medium, and much use. The most utilized foods included duckweeds, and the seeds of narrow-leaved, floating-leaved, and bushy pondweeds, bur-reed, and wildrice. There are a few remarks on notable feeding habits of certain species of ducks. Study of the kill on four lakes revealed that the lesser scaup, ringneck, mallard, coot, and teal, in that order, predominate. Hunting hours to bag a duck averaged 1.7; hunting pressure was measured by acreage per hunter, which was 6.2. Crippling losses varied from 9.5 to 19.1 percent, or more.

Food Habits: Of fox, red

Southern, H. N., and J. S. Watson. Summer food of the red fox (Vulpes vulpes) in Great Britain: A preliminary report, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 20 shillings a copy), 10(1), May 1941, pp. 1-11, 3 tables.

Analyses of the contents of 40 stomachs from Wales and of 18 scats from mid-England. The commonest food was rabbits; next in order were sheep, small birds, and insects. Lambs are killed by foxes but some of the sheep remains probably represent carrion. In discussion, American findings with regard to the same species are mentioned and of the bibliography of 12 titles, 5 are American papers.

Food Habits: Of grosbeak, evening

Michael, Enid. California evening grosbeak, Yosemite Natur Notes (Yosemite National Park, Calif.), 20(9), Sept. 1941, pp. 86-87, 1 fig.

Feeding on buds of cottonwood and white fir, seeds of elm, and fruits of coffee-berry (doubtless Rhamnus). Four other species also noted as feeding on this fruit.

Food Habits: Of hawk, marsh

[Cook, Fannye A.] Marsh hawks found helpful to farmer, Mississippi Game and Fish (Mississippi Game and Fish Commission, Jackson), 5(6), June 1941, p. 4.

Report on analysis of 56 pellets collected near Clinton, Miss. Thirty contained remains of cotton rats and 10 of rabbits; other contents also are listed.

Food Habits: Of hawks

Jackson, Earl. Don't kill those hawks, National Park Service, Region Three (Santa Fe, N. Mex.) Quarterly, 3(3), July 1941, pp. 25-31, 1 photo, 6 figs.

Chiefly compiled general account of economic values of the hawks and vultures of the United States.

Food Habits: Of mammals, small

Hamilton, W. J., Jr. The food of small forest mammals in eastern United States, Journ. Mammalogy (Emmet T. Hooper, Museum of Zoology, Univ. of Michigan, Ann Arbor. $1.00 a copy), 22(3), Aug. 1941, pp. 250-263, 4 tables.

From his unsurpassed experience, the author comments on methods of studying the food of small mammals. The contents of stomachs, cheek pouches, and caches provide most of the reliable data. Hamilton says, "I have little faith in the value of feeding experiments on captive animals in determining food predilections." The groups reported upon include the hairy-tailed mole, long-tailed shrews, short-tailed shrew (460 stomachs), deer mice (566), red-backed mouse, lemming mouse, and woodland jumping mouse. The economic significance of the feeding habits of small forest mammals is discussed. Bibliography of 29 titles.

Food Habits: Of osprey

Evenson, Millard C. An osprey catch, U. S. Forest Service (Missoula, Mont.) Northern Region News, June 6, 1941, p. 29 (mimeographed).

An osprey had on a gravel bar a trout it was evidently unable to fly with; it weighed 2-1/2 pounds.

Food Habits: Of owl, barn

Trembley, F. J., and G. R. L. Gaughran. Pennsylvania barn owl survey, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 12(6), Sept. 1941, pp. 6-7, 28, 5 photos.

Report on the food items represented in pellets (number not stated) from Northampton County; as usual, mice were highly predominant. Notes on the visual acuity of a captive barn owl.

Food Habits: Of owl, great horned

Haecker, F. W. Nesting of the great horned owl in Douglas County, Nebraska Bird Review (F. W. Haecker, 506 South 52nd St., Omaha, Nebr. 50 cents a copy), 9(1), Jan.-June 1941, pp. 8-11.

History of a nesting with notes on food, chiefly rabbits, but including also Norway rat, white-footed mouse, and pocket gopher.

Food Habits: Of oyster-catcher, black

Webster, J. Dan. Feeding habits of the black oyster-catcher, Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 43(4), July-Aug. 1941, pp. 175-180, tables.

Identifications of 8 species of mollusks by their shells scattered where young birds had been fed by their parents; analyses of 12 stomach contents (limpets, mussels, barnacles, Nereis); notes on feeding methods and powers of digestion; estimate of the bulk composition of the annual food of the bird. Also data on distribution and migration. Bibliography of 18 titles.

Food Habits: Of pheasant and quail

Wright, T., Jr. A study of the fall food supply of the ring-necked pheasant and the bob-white quail in Washington County, Rhode Island, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 279-296, 6 tables.

Author's abstract: "Sixty-nine quail and 32 pheasant crops were examined. Percentages of the food items were computed by a modification of the dry-weight method. In this the average weight of each item was determined and multiplied by the total number found. The total dry weight of each item was then used in computing the percentages. The relative nutritive values of the principal plant foods were determined by analysis for protein, fat, carbohydrates, ash, and moisture. Forty-four items, representing 35 plant, and 9 animal, species were identified. Bayberries and grass leaves occurred most frequently. Corn, skunk cabbage seeds, rose hips, and cherry stones were found in more than 20 per cent of the crops. On the basis of weight percentages, the pheasant food consisted of 56.85 per cent cultivated grains, 42.01 per cent woody plants, 16.99 per cent miscellaneous plants, with skunk cabbage the most prominent, and 0.72 per cent and 3.38 per cent wood seeds and animal matter, respectively. Fifty items, representing 42 plant, and 8 animal, species, were found in the quail crops. Ragweed, bayberry, and snapwood fruits occurred most frequently. Wood seeds formed 48.6 per cent of the diet, while products of plants of miscellaneous origin and of woody species made up 22.23 per cent and 19.59 per cent, respectively. Cultivated grains and animal matter made up 7.86 and 1.45 per cent. In general, the foods from woody plants including bayberry, poison ivy, arrowwood, etc., have a relatively low protein and nitrogen-free extract content with high fat and crude fiber. Wood seeds have a high fat and protein content with a varying nitrogen-free extract. Skunk cabbage and snapwood seeds have very high protein and fat levels indicating high nutritive values."

Food Habits: Of porcupine

Curtis, James D. The silvicultural significance of the porcupine, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 39(7), July 1941, pp. 583-594, 4 photos, 5 tables.

Review of literature of which 13 titles are cited. Report on the author's investigations on Mt. Toby Forest, Massachusetts. He points out that porcupine work may be beneficial as well as injurious to the forest. Incorrect interpretation and exaggeration have, in the author's opinion, been largely responsible for prejudice against the porcupine. In text and tables, the kinds of trees and the parts attacked, the percentage of trees in the stand damaged, and a comparison of beneficial and injurious feedings, are recorded. Damage to the Mt. Toby stand was not serious because the forest greatly needs thinning. Damage is difficult to appraise. It may sometimes be counteracted by modification of the silviculture. Preventive methods are suggested. "Although artificial control may be justified in some instances, it is expensive." Further research is needed.

Food Habits: Of prairie chicken

Hamerstrom, F. N. Jr., Frank Hopkins, and Anton J. Rinzel. An experimental study of browse as a winter diet for prairie chickens, Wilson Bulletin (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 53(3), Sept. 1941, pp. 185-195, 2 figs.

Abstract by senior author: "Thirty-eight wild-trapped Prairie Chickens (Tympanuchus cupido americanus) were used in experiments during parts of two winters. Buds and catkins of the six most commonly used (in Wisconsin) browse plants, plus five others and two wild fruits, made up the browse diet; controls ate the same foods plus seven cultivated grains; one lot was fed first on grains alone, then on browse alone. For comparison of results, several different time periods have been converted to uniform periods of two weeks each: the birds on browse alone lost an average of 12.9 percent of body weight, and three starved to death; addition of grains caused a recovery of 7.6 percent in weight; birds on grains alone and browse plus grains lost only 1.5 percent and 0.6 percent, respectively. Considering also the food habits and distribution of wild Prairie Chickens, it is suggested that small numbers may be able to supplement a browse diet with an uncertain supply of weed seeds, but that winter grains are necessary to have Prairie Chickens in numbers in the north central states."

Food Habits: Of rook

Collinge, Walter E. The rook as a friend or foe of agriculture, North Western Naturalist (T. Buncle & Co. Ltd., Market Place, Arbroath, Scotland. 2 shillings a copy), 16, 1941, pp. 7-8.

Review of 7 reports on the economic status of the rook, bibliographic citations to which are given. "Summarising the whole of the figures, we find that 52 per cent of the Rook's food constitutes an injury to agriculture and 28.5 per cent is beneficial, the remainder is of a neutral nature. These figures, however, require interpretating, for, as McAtee, Ritchie and others have pointed out, such figures do not indicate an economic equality, particularly where the numerical method is employed. Where the percentage by bulk or volumetric system has been used, we can at once see that if the countless thousands of insects destroyed in the above-mentioned 28.5 per cent had lived

and propagated, the cultivation of cereals, roots, etc., would have been almost impossible." The rook population varies and when overabundant may need to be repressed. "Repressive measures do not involve reckless and wanton destruction; any such unguided policy would, in all probability, lead to very serious and disastrous results. A systematic taking of the eggs or destruction of the nests in districts where the birds are too numerous would probably be sufficient, but the time for this has not yet arrived."

Food Habits: Of skunk, spotted

Crabb, Wilfred D. Civets are rat killers, Farm Science Reporter (Iowa Agr. Expt. Sta., Ames), January 1941, pp. 12-13, 4 photos.

Little spotted skunks in Iowa feed freely upon rats, mice, and cottontails and but little upon poultry. Their protection about granaries is recommended.

Food Habits: Of snakes, garter

Fitch, Henry S. The feeding habits of California garter snakes, California Fish and Game (Terminal Island, Calif.), 27(2), April 1941, pp. 2-32, figs. 22-23, 1 table.

Notes on the general habits, classification, and distribution of these snakes; key to 12 species and subspecies; account of each of 10 forms that comment upon diagnostic characters, distribution, variation, and habits with special reference to feeding. The notes on food habits are chiefly of field observations. "Some are exclusively terrestrial in their foraging, and others are almost entirely aquatic and hence use a different sort of food. Some may conflict with man's interest by preying upon trout and other fishes valued as food or game. Other kinds of snakes, though closely related to these potentially harmful kinds, are almost entirely beneficial in their economic bearing, since they prey upon animals which are detrimental to man's interest--vegetation-destroying slugs. Still others have no obvious economic importance, as they prey upon animals which are largely neutral and have neither direct value to man nor harmful habits--various small lizards, frogs, salamanders, worms and leeches." Bibliography of 17 titles.

Food Habits: Of waxwing, cedar

Goodrich, Arthur L. Waxwings gorge upon apple blossoms, Oologist (Albion, N. Y.), 53(9), Sept. 1941, pp. 106-107.

Manhattan, Kansas; careful and well-described observation.

Food Habits: Of wood rat, white-throated

Spencer, Donald A., and Alice L. Spencer. Food habits of the white-throated wood rat in Arizona, Journ. Mammalogy (Emmet T. Hooper, Museum of Zoology, Univ. of Michigan, Ann Arbor. $1.00 a copy), 22(3), Aug. 1941, pp. 280-284.

More than a thousand dens were opened to learn the character of the wood rat's food and experiments performed to determine the quantity (60% of the animal's weight in cactus daily). Cactus is first in importance, both joints and fruits being taken. The wood rat plays but a minor role in the spread of cactus seeds and in its feeding upon the joints is a check rather than an aid to distribution of the plants. Next to cactus, green leaves, and after those, fruits of shrubs are the foods most commonly stored in dens. Details are given. While grasses were freely eaten by captive animals, none were found stored; they are, however, much used as nest material. Data thus far collected do not indicate undue pressure on range grasses.

Life Histories: Bat, Free-tailed

Brodrick, Harold J. Millions of bats, National Park Service, Region Three (Santa Fe, N. Mex.) Quarterly, 3(3), July 1941, pp. 2-6, 2 photos.

General remarks on bats, and more specific notes on Tadarida mexicana at Carlsbad Caverns and vicinity. More than 100,000 tons of guano are said to have been sold formerly at prices as high as $50 to $90 a ton. Flights of the species once estimated to comprise 3 to 5 million individuals are now seen only in hundreds of thousands. Horned owls observed to catch a few.

Life Histories: Bison

Soper, J. Dewey. History, range, and home life of the northern bison, Ecological Monographs (Duke University, Durham, N. C. $1.50 a copy), 11(4), Oct. 1941, pp. 347-412, 19 figs.

A comprehensive article summarizing all that has been written, and all learned by the author and associates about the bisons of Wood Buffalo Park, Canada. Appearance, range, and abundance of the animals are commented upon; the environment and its weather phenomena described, and all phases of the life history of the bison discussed. Hints are given as to detection and census methods and as to travel at all seasons in the northern wilderness. There is an extensive bibliography. Few American mammals have been written about so extensively and so well.

Life Histories: Blackbird, Yellow-headed

Fautin, Reed W. Incubation studies of the yellow-headed blackbird, Wilson Bulletin (J. Van Tyne, University of Michigan, Ann Arbor. 50 cents a copy), 53(2), June 1941, pp. 107-122, 2 figs., 7 tables.

Author's summary: "The nesting activities of two colonies of Yellow-headed Blackbirds, located in the vicinity of Utah Lake west of Provo, Utah, were studied from April to mid-September. Eighty-three females nested in the Provo River colony and 40 in the Lakeview colony. Egg-laying began May 7 and 61.8 per cent of the females laid their first egg within one day after the completion of the nest. The number of eggs per set varied from 2 to 5, with 4 the most common number (68 per cent). The females were not assisted by the

males in any way in the incubation of the eggs, 56.6 per cent of them beginning incubation at the time the second egg was laid, with a tendency for the beginning of incubation to be delayed longer the larger the clutch. The length of the incubation period varied from 12 to 13 days, 74.6 per cent of the eggs hatching in 12 days. The attentive periods during incubation ranged in length from one to 41 minutes, with an average of 9.1 minutes. These periods were longest during mid-day when the females were seemingly protecting their eggs from the sun. During 83 hours of observation the females spent an average of 63.9 per cent of their time on the nest, with a range from 53.1 to 69 per cent. The inattentive periods ranged in length from one to 18 minutes, with an average of 5.4 minutes. These periods tended to be longest during the morning and evening hours when feeding was most intensive. The hatching success of the larger Provo River colony amounted to 75.7 per cent, while that of the smaller Lakeview colony was only 60.6 per cent, giving an average of 70.9 per cent for the two. Wind and predation were responsible for the destruction of 90 (20.3 per cent) of the eggs before the time of hatching, and 39 (8.8 per cent) failed to hatch because of being addled or infertile. The lesser degree of nesting success of the Lakeview colony was due to a greater amount of predation which in turn may have been the result of a more prolonged nesting season." Bibliography of 18 titles.

Life Histories: Cottontail, Audubon's

Ingles, Lloyd G. Natural history observations on the Audubon cottontail, Journ. Mammalogy (Emmet T. Hooper, Museum of Zoology, Univ. of Michigan, Ann Arbor. $1.00 a copy), 22(3), Aug. 1941, pp. 227-250, 2 pls., 5 figs., 2 tables.

The author describes the methods employed in the study, which was carried on in parts of 5 years near Durham, California. He discusses the findings as to general habits, senses, home range, enemies, escape behavior, parasites, food, breeding, nests, growth, and life span. Range of females is about an acre, of males perhaps as much as 15 acres. Number of young to a litter varies from 1 to 5; breeding occurs throughout the year. The maximum life span is two years or less. Bibliography of 13 titles.

Life Histories: Deer, White-tailed

McBeath, Donald Y. Whitetail traps and tags, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 10(12), Nov. 1941, pp. 6-7, 4 photos, 1 map.

The text tells something of trapping and illustrations show the tagging method. Notes on findings relate to sex ratio (fawns 444:456; adults 1:2 to 1:4) and to homing and wandering radiuses (maxima 20 and 32 miles, respectively).

Life Histories: Dove, Mourning

Moore, George C., and Allen H. Pearson. The mourning dove in Alabama, Alabama Cooperative Wildlife Research Unit (Auburn, Ala.), 36 pp., 3 maps, 4 graphs, and numerous photos, July 1941,

Report on investigations 1935-41 with pertinent general information. Range and characteristics, courtship and mating, nesting habits, development of the young, feeding habits and foods, migrations, and management possibilities are discussed. Adequate protection and maintenance of the supply of preferred foods are the most important measures. Bibliography of 17 titles.

Life Histories: Duck, Ruddy

Low, Jessop B. Nesting of the ruddy duck in Iowa, Auk (Rudyard Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 58(4), Oct. 1941, pp. 506-517, Pl. 17, 3 tables.

A 3-year investigation revealed that the most important nesting cover plants were hard-stem bulrush and lake sedge in either pure or mixed stands, growing in 10-12 inches of water. The egg hatch was 71 percent; predation was negligible. The most destructive factor was fluctuation in the water level. Bibliography of 10 titles.

Life Histories: Elk

Wost, Raymond M. Elk of the northern Rocky Mountain region, U. S. Forest Service (Missoula, Mont.) Field Notes on Wildlife, 2(9), Aug. 1941, 32 pp., 1 map, 1 graph, 4 tables (mimeographed).

Range of the animals, their history in the region, general description, life history, and habits. Size of harems and of herds is discussed and special attention given to feeding habits. A table covering 4 pages records the comparative values of grasses, weeds, shrubs, coniferous trees, lichens, and mosses in the winter diet of elk and deer and also of domestic stock in 3 subregions. Summarizing sections relating to reproduction, the author notes that the numbers of the sexes are about equal at birth, that between 75 and 90 percent of mature females have young, and that twin births are rare. Except for the killing of calves, predation is not a serious drain upon elk numbers. Losses from parasites and diseases (which are listed) is not great. The estimated numbers of elk alive upon the various national forests of the region, and killed during the 1940 hunting season, are tabulated--totals 38,000 and 5,300, respectively. Increase has been almost continuous since 1923. Tables record the numbers and status of both native and planted elk on or adjacent to the national forests of Montana and northern Idaho. The distribution of the animals in native and planted herds and scattered bands is mapped. The report, a compilation from numerous sources, contains many bits of information not mentioned in this abstract.

Life Histories: Fox, Gray

Bailey, Vernon. Gray foxes--all Americans, Nature Magazine (1214 Sixteenth St., N. W., Washington, D. C. 35 cents a copy), 34(9), Nov. 1941, pp. 493-495, 528, 2 photos, 1 map.

Characters, appearance, calls, habits (considerable on food), and list of 21 subspecies, briefly annotated as to color, measurements, and range (the latter also indicated on the map).

Life Histories: Ground squirrels

Scheffer, Theo. H. Ground squirrel studies in the Four-rivers country, Washington, Journ. Mammalogy (Emmet T. Hooper, Museum of Zoology, Univ. of Michigan, Ann Arbor. $1.00 a copy), 22(3), Aug. 1941, pp. 270-279, 2 pls.

An interestingly written account of the life histories of Townsend's and Washington ground squirrels by seasonal periods. A summary of the observations is presented. Average number of fetuses of Townsend's ground squirrel, 8.6, and of the Washington, 8. "Food of these squirrels consists mainly of succulent stems, roots, buds, seeds and pods of bunch grass (Agropyron spicatum), mallow, brome grass, plantain, mustard, and, to a limited extent, of cultivated grains and alfalfa when such crops are near their colony sites. On emerging from hibernation the squirrels greedily nibble the short, green grass or herbage."

Life Histories: Moose

Kollum, Ford. Cusino's captive moose, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 10(7), June 1941, pp. 4-5, 2 photos, 1 table.

Although based on observations upon captive animals, this report is interesting as supplementing scanty information on wild moose. The construction of corrals and feeding racks is described. The animals freely used an old mill pond as a wallow. The kinds of browse and supplements fed are listed. Of more than 200 pounds given daily, a moose consumes from 40 to 50 pounds per day in winter and from 50 to 60 in summer. Information is recorded on weights of the sexes at various ages; maximum about 1,200 pounds. Mating behavior is described. The gestation period is approximately eight months. Notes and measurements are given relative to the growth of antlers. Comment on the keenness of their senses also is included.

Life Histories: Mouse, Field

Hamilton, W. J., Jr. Reproduction of the field mouse, Microtus pennsylvanicus (Ord), Cornell University (Ithaca, N. Y.) Agr. Expt. Sta. Memoir 237, 23 pp., 9 figs., 3 tables, 1941.

This species is "probably the most rapid breeder of all known mammals." The material (including 4,000 specimens) and methods used in the author's study are reported. The reproductive organs of both sexes of the mice are described and illustrated. Discussion proceeds on age of sexual maturity (25-30 days), oestrus and mating behavior, fertility, number of embryos (usually 3-8), parturition, growth of young, number of litters (5-10 annually), mortality of young, life span (10-16 months), climatic factors and the breeding season, and probable cause of winter breeding. Bibliography of 13 titles.

Life Histories: Peccary

Walker, M. V. These little pigs have a way, National Park Service, Region Three (Santa Fe, N. Mex.) Quarterly, 3(3), July 1941, pp. 15-18, 1 photo.

Notes on the musk gland and its uses and certain traits of the animal. Reference cited because of scarcity of information on the javelina, but with the suggestion that the article is definitely teleological.

Life Histories: Pheasant, nesting, Minnesota

Rollings, Clair T. Checking up on the pheasants, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 3(13), Oct. 1941, pp. 41-44, 2 tables.

1,500,000 male pheasants were bagged in 1940, yet the subsequent sex ratio, 1:3, is not considered disproportionate for successful mating. Pheasants waste many eggs in early season depositions; the effective nesting period extends from May 1 to June 15; later efforts are of birds losing their first clutches; some of them result in reduced broods. Of 241 nests studied, 69 or 28.6% were successful, and 172 or 71.4%, unsuccessful. The principal agents of destruction were man, destroying 70 nests (40.6%), predators 40 (23.2%), abandonment, 30 (17.4%), and inclement weather, 24 (13.9%). A table shows the average brood size during 4 periods of the summer.

Life Histories: Pheasant, nesting, Ohio

Strode, Don H. The 1940 pheasant nesting study in Wood County, Ohio, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 157, 34 pp., 4 graphs, 1 map, 22 tables (mimeographed).

The annual report on this study; previous installments and other related papers are cited in a bibliography of 16 titles. The methods of the investigation are described and a record form reproduced. Five hundred and thirty-nine nests were found, of which 197 (36.6 percent) were successful. In the four cover types that harbored 97 percent of the nests, losses were about in proportion to total numbers of nests found. Of the nests unsuccessful in all types of cover, 76.6 percent were destroyed by man. Figures are given for nest prevalence and nest losses in various covers, and for clutch-sizes and fertility. Pheasant nesting density decreased with continued use of alfalfa fields: 126.2 to 100 acres the first year; 73.4 the second, and 45.9 the third. The percentage of successful nests also steadily decreased. Night cutting of sweetclover resulted in mortality more than 5 times as great as in day mowing.

Life Histories: Pheasant, nesting, Pennsylvania

Randall, Pierce E. The life equation of the ringneck pheasant in Pennsylvania, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 12(4), July 1941, pp. 6-7, 28-31, 9 figs., 12 tables.

Report on a study conducted on first-class pheasant range in an intensively cultivated tract in Lehigh County in 1938 and 1939. The breeding population was about 1 bird to 8 acres; the sex ratio was 1:7, yet fertility of eggs was 94.1 percent. The history of a population of 950 birds on 1,675 acres is traced through reductions from all causes to a low of 180 and to a new high a year later of 850. Hunting season loss amounted to 650 out of the original stock of 950. The utilization of nesting cover (alfalfa most popular) and the success of nesting attempts are analyzed. Only 25.4 percent of the nests were successful; mowing was the most serious cause of destruction (49.8 percent) and predation second (30.7 percent). Through renesting efforts 52-55 percent of the hens raised broods; juvenile mortality was low (12.4 percent). Bibliography of 21 titles.

Life Histories: Squirrel, Gray

Hungerford, K. E., and N. G. Wildor. Observations on the homing behavior of the gray squirrel (Sciurus carolinensis), Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 458-460.

Authors' summary: "Of 15 gray squirrels trapped from a single feeding location in Storrs, Connecticut, and released along various lines through nearly continuous forest cover, six were recaptured at the original site. Of these, three returned twice. The maximum distance from which squirrels returned was 14,800 feet. This occurred once in less than four weeks, representing the fastest time per unit distance traveled. The largest return was among the first group of squirrels trapped from the area prior to December 11, 1939. This was thought to be due to greater familiarity with the section by the squirrels originally inhabiting territories nearby, and to a lack of snow which during the latter part of the winter served to restrain movement of the animals. Only one female was retrapped, possibly because of the naturally lesser activity of this sex, showed by small mammals."

Life Histories: Tern, Common

Palmer, Ralph H. A behavior study of the common tern (Sterna hirundo hirundo L.), Proc. Boston Soc. Nat. Hist. (234 Berkeley St. Boston, Mass. $1.00 a copy), 42(1), 119 pp., 2 charts, 14 pls., July 1941.

The food habits of the species are reviewed from the literature and also originally noted, as are also relations with other species, parasitic and predatory. The work is not a complete life history but is largely a study of common tern behavior, made according to modern techniques and liberally illustrated by the author by line drawings mostly after photographs. The environment--Sugarloaf Islands, Maine--is described and all activities of the birds observed there detailed, discussed, and summarized. To a high degree the breeding colony acts as a unit. An excellent paper. Bibliography of 9 pages.

Life Histories: Waterfowl

Stoudt, Jerome H. Waterfowl in the Chippewa, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 2(12), Sept. 1941, pp. 20-24.

Chippewa National Forest. Averages of census data for 4 years show the mallard to compose 42%, the blue-winged teal 23%, and the golden-eye 16% of the breeding duck population. Brief accounts of the habits of these three species and of the ring-necked duck (9%) are given.

Management: Attracting birds

Bromley, S. W. Trees and shrubs attractive to birds, Scientific Tree Topics (Bartlett Tree Research Laboratories, Stamford, Conn.), 1(6), 1941, pp. 43-44.

Notes on fruit-bearing species, with a list of 29 kinds of birds seen feeding on mulberries.

Management: Attracting birds

Musselman, T. E. Bluebird housing project, Bluebird (Audubon Society of Missouri, Sullivan, Mo.), 8(11), Nov. 1941, p. 75 (mimeographed).

The author, who has long carried on a campaign to aid bluebirds, states that he has installed 500 boxes for them and in good years has "better than 90% occupancy." To lessen competition by English sparrows and starlings, boxes are not placed near houses or barns. Fence junctions, with some shrubbery, but without vines that will cover the box are preferred sites; the box should be on the outside of the fence and not on the pasture side where it might be rubbed off by cattle, and should touch a barbed wire if one is available. The author (Quincy, Ill.) has distributed leaflets giving plans for bluebird houses and directions for placing them.

Management: Atttracting birds and mammals

Benjamin, J. R. Shell box carpentry, Ohio Conservation Bul. (Division of Conservation and Natural Resources, Columbus, Ohio), 5(10), Oct. 1941, pp. 20, 26, figs.

Illustrated directions for making bird and mammal feeders and shelters. Reprints of the article are available at the address given.

Management: Beaver ✓

Bump, Gardiner. Problems of beaver management in a fish and game program, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 300-306, 1 map.

Beavers, once greatly reduced, increased as a result of protection and plantings and caused many complaints of damage. The State of New York tried control by paid trappers and by allowing complainants to dynamite dams, and shoot or trap the animals under permits. The second method proved more economical and more satisfactory. Experience with both systems is sketched and the injuries and benefits associated with beavers are listed. Author's summary: "To sum up, the successful introduction of beavers into a favorable environment inevitably engenders a host of problems. Those arise from, or are affected by, the value of the resultant fur crop, the deep public interest in beavers, the probability that some of the beavers will become a nuisance, the impracticability of handling this problem through continued removal of beavers by state trappers, the necessity of developing more satisfactory methods of control, and the pulling and hauling of divergent interests that are affected variously by an increase in beaver abundance and activities. These matters should be carefully analyzed and their effects weighed before the species is introduced.

"Some one has defined a weed as merely a plant out of place. Even beavers can be in this category unless they are properly managed." Bibliography of 7 titles.

Management: Beaver ✓

Schoffer, Victor B. Management studies of transplanted beavers in the Pacific Northwest, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 320-325, tables.

"There are three important phases in management of the beaver in the Pacific Northwest: (1) Protecting the animal as a producer of fur, (2) removing it from highly cultivated lands, and (3) putting it to work as an agent in soil and water conservation in mountain meadows. In the present stage of land use in the Pacific Northwest, and for some years to come, to manage the beaver as a producer of fur is less important than to use it as a soil and water engineer." In the author's opinion, the open season for public trapping of beavers has had unfortunate results. He believes that trapping should be done only by trained game officers. The results of transplanting operations are summarized in a table. Three-fourths of the liberated colonies disappeared from the planting site in a few days or weeks. Eight principal reasons for this are suggested. The food relations of beaver colonies are discussed under four heads and the principal food trees of the animals are listed. Rates of tree cutting and lodge and dam construction are cited. The average amount of water stored by a colony at the end of the third year was about 15,000 cubic feet. Author's conclusions: "(1) The number of beavers dead-trapped where they are doing damage should be increased; (2) the causes that contribute to the failure of plantings are sufficiently well known that, by careful attention to the selection of sites, the game manager can establish 60 per cent of the colonies released; (3) considering the wide variety of habitats under which beavers are known to thrive, it is not practicable to determine beforehand, by the use of numerical standards only, the carrying capacity of a prospective planting site."

Management: Beaver

Zelinske, Walter. Beaver location, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 6(6), June 1941, pp. 42-44.

Discussion of damage done by flooding areas and cutting trees. In relation to trout the author says, "In some streams that the beaver have dammed the fishing became poorer, in others it became better." In response to complaints, beavers are trapped and moved to favorable habitat where they are not likely to be destructive.

Management: Burning marshes

Lynch, J. J. The place of burning in management of the Gulf Coast wildlife refuges, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 454-457.

Author's abstract: "Fire is a natural factor in the ecology of the Gulf Coast marshes. This study reviews the uses which man has made of fire in handling marsh lands and finds that burning is a most efficient and practical tool in marsh management for cattle, fur, and waterfowl. Marsh fires are classified as cover burns, root burns, and deep peat burns. The functions of burning are: improving habitat, promoting food production, increasing availability of food, protecting the marshes from uncontrolled fire, and facilitating trapping."

Management: Deer, White-tailed ✓

McCain, Randal. Removing surplus deer by hunting, Allegheny National Forest, Pennsylvania, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 332-338, 2 figs., 1 table.

From the stage of almost complete extermination, Pennsylvania deer, aided by introductions, protective laws, refuges, and excellent environmental conditions, so increased as locally to threaten destruction of their forage supply. The Alleghany Forest was one of the badly affected areas. Public sentiment had to be changed before effective steps could be taken to decrease the herds. Finally the killing of antlerless deer was authorized for a 3-day season in 1935 and for 6 days in 1938. The table shows the seasons allowed, estimated numbers of hunters of deer (both antlered and antlerless) from 1931-40 inclusive. "The legal take of 24,000 antlerless deer x x x 1938 was even larger than the total that most sportsmen had been willing to admit existed in the area, yet nearly two animals remained for each one killed." The progress of the herd and the customs of hunters are discussed (illustrated by graphs) and the following conclusions drawn: "Special seasons create concentration of hunting, resulting in accident hazards, excessive illegal kill, and considerable public dissatisfaction. The deer range is now badly depleted; the animals are concentrated in a few drainages and despite losses aside from the legal kill of more than 80,000 head in the past seven years, a surplus still

exists. We have every reason to believe, however, that cooperative effort will soon see this herd put on a sustained yield basis, wherein a balance is maintained between numbers and the forage supply." Bibliography of 10 titles.

Management: Duck food plants

Bellrose, Frank C. Duck food plants of the Illinois River valley, Illinois Natural History Survey (Urbana), Bul. 21(8), Aug. 1941, pp. 235-280, 35 figs., 11 tables.

The hydrography of the river and especially its fluctuating water levels are described in their relation to aquatic plants. Several maps show the distribution of the plants in different types of environment. The important duck food plants, competition between them, methods of control of undesirable, and of propagation of desirable, species, and management procedures are discussed. The publication has various points of novelty, is well illustrated, and informative. From the 26 paragraphs of summary a few are quoted: "A comprehensive survey of plant species in 1938, 1939 and 1940 in more than 20 lakes in the Illinois River valley revealed that sago and longleaf pondweeds, coontail and marsh smartweeds predominated at lakes with stable water levels. River bulrush, American lotus and coontail topped the list in semi-stable lakes. In lakes with fluctuating waters, only river bulrush and American lotus were abundant. In 1936, 1937 and 1940, however, moist-soil plants--such as millets, smartweeds, nutgrasses and water hemp--were very abundant on the mud flats about certain lakes of this last class. Rice cut-grass, coontail, marsh smartweed and longleaf pondweed were the best duck food plants in the Illinois River valley in 1938, when moist-soil plants were wanting. Wild and Japanese millets, pigweed, nutgrasses and nodding smartweed were among the top-ranking foods in 1939 and 1940. American lotus, river bulrush, buttonbush and willow furnish little or no duck food, and are undesirable in many waterfowl feeding grounds, since they compete with more valuable duck food plants. Only fair and temporary benefits have thus far resulted from thousands of dollars spent by duck clubs on waterfowl food plantings. Aquatic and moist-soil plants generally appear naturally in areas when suitable environmental conditions occur."

An appendix listing the waterfowl food plants of the Illinois River valley includes numerous local names.

Management: Farm game

Clark, Arthur L. An indirect approach to wildlife conservation, Pittman-Robertson Quarterly (U. S. Fish and Wildlife Service, Washington, D. C.), 1(2), April 1941, pp. 99-105, 2 photos.

The objectives of the Federal Aid to Wildlife Restoration program, and the fundamental assumptions upon which it is based are defined. Principles and progress are reported. To the reviewer, this paper gives a marked impression of common sense as in the following paragraph: "The studies of the Federal Aid Program in Missouri to date suggest that under present conditions an approach that concerns itself with the conservation and restoration of the

whole biota and recognizes the landowner as the key to the entire problem may be the most effective. In this approach, the conservation and restoration of soil, accomplished by wise use of his land appeals to the farmer because it affects his personal income and advantages. And, in a larger sense, this approach affects all human activities. Agencies which deal with the conservation of natural resources and which fully recognize the farmer, approach the problem from the point of view of the farmer's major interests. Hence, any projects suggested must first provide for major needs of the farmer, the farm family, and the farm community, which are as follows: (1) More productive land. This furnishes the necessities of life and may lead to additional comforts and advantages; (2) more attractive farm life. This keeps the farm family together and more contented. The influence extends to the community."

The author illustrates the working of the plan by showing how cooperating agencies enabled a farmer to install a pond and solve among other problems that of getting water for his stock. This assistance induced the farmer to become an active friend of the agencies. "The interests of the farmer, the community, and the sportsmen were served in the order named." In restoration as applied in Missouri, artificial propagation and liberation are resorted to only when unusual exigencies demand. That these are few is shown by the statement that, "The Conservation Commission neither owns nor operates a game farm." The program is concerned only with native game and the amount needed for restocking is becoming less each year. "Once a farm has been stocked and placed under management, it should not need restocking again." "The task of applying wildlife management practices, based on natural methods, to an area as large as the State of Missouri, is in the process of being accomplished within a reasonable period because of the large number of farmers and others who are becoming actively interested in the broader biotic problems involved."

Management: Farm game, productivity✓

Ruhl, H. D. Carrying capacity of southern Michigan game range, Trans. Sixth N. A. Wildlife Conference 1941, (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 126-131.

None of the present most important farm-game species were plentiful in Michigan under primitive conditions, and the ring-necked pheasant, of course, had not yet been introduced. The wildlife population of four sample areas studied by the Game Division during the past five years is discussed and comment made upon the numbers of animals in relation to area and upon the results of hunting. The author's conclusions are: "From these studies it appears that relatively intense agricultural use of the land does not particularly handicap the pheasant, but that such use removes the brush and woodland required by rabbits and squirrels. Marginal farmland, with waste areas containing brush, is Michigan's best rabbit range. These areas also support the oak-hickory woodland that is probably the State's most productive fox squirrel habitat, but their pheasant production is usually low. Submarginal lands too poor for agriculture usually are occupied by black and white oaks. This is a fair to good habitat for fox squirrels, but poor for rabbits and often supports no pheasants at all.

Management: Farm wildlife ✓

Hochbaum, H. W. Agriculture's interest in conservation, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 24-27.

The welfare of wildlife greatly depends on the way we manage the 85 percent of our land that is controlled by agricultural interests. Some of the lands now devoted to farming could well be used for recreational purposes, including hunting. The Texas program of encouraging farmers to enjoy wildlife resources, to make the most of them, and to conserve them, is praised. Zoning operations in several states are returning lands from agriculture to forestry and enhancing opportunities for wildlife conservation. The Extension Service of the Federal Department of Agriculture is encouraging attention to wildlife on farms and the Boys' and Girls' club members it instructs are showing a growing interest in conservation. Cooperation is easier to obtain than coordination but both are required for success in handling wildlife to the best advantage.

Management: Field borders

Davison, Verne E. Wildlife borders--an innovation in farm management, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 390-394, 2 pls., 1 fig.

Author's abstract: "The wildlife border is presented as a means of land management in the new land-use patterns of southeastern agriculture. It is particularly needed between woodland and cropland and is a vegetated strip designed for multiple use for a turn row, erosion control, water disposal, control of trees, and for beauty and wildlife food and cover. The recommended border consists of two parts: A strip of Lespedeza sericea next to the crops and one of shrubby vegetation next to the woods. The herbaceous portion (15 feet wide) must be maintained free of shrubs and the woody portion (20 feet wide), free of trees. The border serves wildlife best for nesting sites, travel lanes, roosting and resting areas, and escape coverts. Emergency food is also provided by Lespedeza sericea and by woody plants such as sumac, honeysuckle, grape, blackberry, dogwood, cedar, wild cherry, and persimmon, although the principal foods are available in the cropland on the one side and the woodland on the other. The wildlife border is acceptable to most farmers because of its simplicity, its easy maintenance, and its multiple values. The importance of this acceptability is stressed as a limiting factor to the use of wildlife management practices in agriculture."

Management: Forest wildlife

Davenport, L. A. Timber vs. wildlife, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 39(8), Aug. 1941, pp. 661-666.

The author writes mostly of matters regarding which he frankly says he is confused and poses, rather than answers, questions. He does, however, cite

the case of Drummond Island, Mich., where big game hunters spend about $30,000 annually. And he states that wildlife habitat has been damaged by tree planting in areas submarginal for forest growth. He wonders whether wildlife management will come into its own only on areas experience demonstrates to be unprofitable for forestry. He speculates that when those lands are allotted, the wildlife manager will have the cooperation of foresters in using fire as a tool in managing it--or does he but dream?

Management: Forest wildlife

Shantz, H. L. Game management. (Address delivered at Salt Lake City, June 1941, presumably obtainable from the Forest Service, Washington, D. C.) 6 pp. (mimeographed), 1941.

Game management is concerned with regulation of habitat and control of animal populations. Range management must be adjusted to ever-varying conditions but should always be conservative, keeping feed use 25 percent below the average production as a necessary margin of safety. Whenever range is deteriorating there is a surplus of herbivores that should be removed. "Choice timberland should not be managed as grazing land or good grazing land as timberland." On many areas, however, multiple use for forestry and livestock and wildlife production is feasible and desirable. Wildlife has the run of all national forest land (about 1 in each 10 acres of the United States), while domestic stock is limited to about half of the total area of these reservations. Refuges on national forests exceed 35,000,000 acres, more than the combined areas of national parks and refuges of the Fish and Wildlife Service. The tendency, however, is to drop absolute protection, in favor of management for use, of wildlife on the forests. Public sentiment having so pronounced an influence upon wildlife protection, there must be a continuous campaign of education to obtain approval for management policies recommended by specialists. Cooperation between all agencies involved is essential and is the goal of the Forest Service.

Management: Fur animals ✓

Ashbrook, Frank G. The position of fur resources in the scheme of wildlife management, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 326-330.

Fur animal conservation may be made to pay for itself with perhaps something left over for other objectives should need arise. The author deprecates the subordination of tangible, to intangible, values in conservation and hails the revenue-yielding record of the Pribilof fur-seal herd as outstanding. Fur animals though benefited by refuges established for other forms of wildlife should have some of their own. "In the not too distant future fur animals may be paying the way for the migratory waterfowl." States should give more attention to fur animal conservation and should afford certain threatened species complete protection. The restoration of beavers after general decline is cited as an example of what fur animal management can do. Last year (1939-40) these animals added $1,250,000 to the national income.

Author's summary: "The principal object of conservation, whether of fur animals or other forms of wildlife is 'Conservation with wise use.' Applying this principle involves a comparison of sporting and commercial values that up to the present time has been largely avoided. However, any conflict of activities between sportsmen, trappers, and fur traders uselessly wastes both time and energy. These groups should work out their problems together and present a united front in urging legislation concerning conservation. The drainage of swamps and lakes not only is inimical to waterfowl, but also does away with the muskrat which could ultimately pay for the lands; forest fires destroy fur animals as well as game; and polluted waters destroy the food of these animals. Where there is laxity in the enforcement of game laws the situation is usually worse with respect to fur animals. At present, when public attention is turning more and more towards conservation and restoration it would seem to be the wise policy to treat fur animals as a valuable resource worthy of cultivation. All of us who are vitally interested in the conservation should insist that fur animals be given favorable consideration in evolving plans or policies for the maintenance and use of our wildlife resources."

Management: Grouse, Prairie

Viehmyer, Glenn. The present status of the greater prairie chicken and sharp-tailed grouse in the Sandhill Region of Nebraska, Nebraska Bird Review (F. W. Haecker, 506 South 52nd St., Omaha, Nebr. 50 cents a copy), 9(1), Jan-June 1941, pp. 1-7.

Review of the status of the birds. Conditions originally favorable deteriorated but have recently improved, especially in the Sandhill Region. Food is as plentiful, if not more abundant, than ever; natural enemies are less; and recent breeding seasons have been favorable. Nesting grounds are the limiting factor, but where grazing control in addition to the necessary ecological conditions prevails, the birds are relatively safe. The author's conclusions are: "(1) That at the present time the Nebraska sandhill region is the only area in the state that has much value as a breeding ground for the Greater Prairie Chicken and the Sharp-tailed Grouse; (2) that unless the present favorable nesting conditions are maintained the sandhills will also lose much of their value in this respect; (3) that while other grazing lands of the state could by proper management be made acceptable as breeding grounds, it is highly improbable that such management will ever be developed; (4) that we now have a sufficient number of breeding birds to restock those parts of the state that are capable of supporting populations of these two species of upland game birds; and (5) that the preservation of these species is dependent upon the establishment and maintenance of suitable nesting areas, and that only through the cooperation of all interested persons and agencies can such breeding grounds be established and maintained."

Management: Harvest ✓

Hicks, Lawrence E. What happens during a game harvest?, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 338-347, 7 figs.

Report on Ohio studies contributory to a management program. Turnover in cottontail populations is practically as rapid on areas closed, as on those open, to hunting. Hunting, while accounting for only a small part of the total mortality, removes from one-fourth to three-fourths of the adult animals. Losses of mature pheasants are 64 percent during the hunting season, 18 in the reproductive period, 12 in winter, and only 6 percent during the remaining 3-1/2 months. Under present hunting conditions, a population of 100 cock pheasants will be reduced to 1 in 27 months and of hens to 1 in 57 months. About 91 percent of the annual mortality of adult cock birds is due to hunting and though illegal, 35 percent of the hens. Crippling losses are about 18 percent. The killing of hens seriously reduces production and "other management measures seem not worth taking until this unnecessary leak is plugged." Hunters are classified and it is shown that 46 percent of them are farmer-landowners. Nearly two-thirds of farm operators participate in the annual game harvest. On account of their sympathetic viewpoint, the larger the proportion of such hunters the more favorable conditions are for non-residents desiring to hunt. Hunting pressures analyzed show marked correlation with the progress of the season and the occurrence of holidays. About 22 percent of the 14-day season's game bird hunting is done on the opening day, 46 percent during the first three days, and only about 6 percent during the last two days. Nearly 55 percent of the season's bag of pheasants is taken during the first three days of the season. Records of a staggered season showed that it resulted in a somewhat larger kill and failed to spread hunting pressures more evenly throughout the open period.

Management: Harvest, deer

Schunke, William H., and Irven O. Buss. Trends in the kill of Wisconsin whitetail bucks, 1936-1940, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 333-336, 1 pl., 1 fig., 7 tables.

Authors' abstract: "Measurements of 452 whitetail bucks were made from 1936 through 1940 and compared from year to year to determine whether or not the deer were decreasing in size and whether their antlers were becoming progressively smaller. Age classes based on beam measurements, number of tines per head, and actual weights were used in making comparisons. The average dressed weight of 108 bucks showed a progressive decrease between 1936 and 1940. With the decrease in weight since 1936, there was a corresponding decline in the number of bucks of the older age classes, and in bucks with eight or more tines per head."

Management: Harvest, furs

Hayne, D. W. Michigan trappers, Mich. Agr. Expt. Sta. (East Lansing) Special Bul. 307, 34 pp., 6 figs., 10 tables, 1941.

Sources of information were reports from fur trappers and buyers and a study of farm trapping in Williamston Township, Ingham County. The history of the fur trade in Michigan is reviewed; it was a major income producer up to 1812. Though a minor industry, trapping still yields a million dollars annually in the State. The data available to the author are statistically treated

and discussed in detail. General conclusions are that trapping is largely carried on by rural boys and young men and that their average income from this source was about $20 in a season of low prices. Most trapping is done in the southern more densely populated part of the State. Farm families do most of the trapping and, as landowners, control the future of the fur resources of Michigan. Bibliography of 14 titles.

Management: Harvest, game kill, Wisconsin

Anon. The 1940 game kill, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 6(6), June 1941, pp. 8-11, 8 figs., 1 table.

The kill by species for 1940-41 compared with that of 1939-40, the totals for each season exceeding 4,400,000. Discussion of the trends for various groups.

Management: Harvest, squirrels

Chapman, Floyd B. The 1940 squirrel harvest on ten public hunting preserves in Ohio, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 162, 17 pp., 6 figs., 10 tables (mimeographed), June 1941.

This sixth of a series of reports on controlled squirrel hunting discusses the status of the gray species in relation to variations in food supply and to its own cyclic fluctuations and gives findings for the 1940 season relative to harvest, hunting pressure, sources of hunters, hunter efficiency, arms and ammunition used, crippling losses, weights of gray squirrels, and the gray squirrel-fox squirrel ratio. Bibliography of 28 titles.

Management: Inventory, appraising quail lands ✓

Stoddard, Herbert L., and Ed. V. Komarek. The carrying capacity of southeastern quail lands, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 148-153.

The development of agriculture in the Southeast in relation to quail production is sketched. At present, three unfavorable trends are in evidence: Protection of pine woodlands from fire resulting in dense growth that excludes quail; intensified grazing reducing carrying capacity; and mechanized farming of crops in large blocks producing a monotonous environment. Good quail land is defined as that upon which from 15 to 20 or more covies can be found with good dogs in a six-hour day. It ordinarily requires about 10,000 acres to produce an average yearly bag of a thousand quail. Some lands are so poor as not to justify intensive management. On the other hand, an average population of one bird per two or three acres over large areas can be maintained at comparatively small cost. To double that population, however, might cost ten times as much. Suggestions are given as to making rough estimates of the number of covies, which are all that are necessary for practical appraisal of quail lands. Good shooting cannot be economically maintained without soil that is basically fertile and adapted to the growth of native legumes and

other feed." The soil should be well drained; otherwise native food plants do not thrive and standing water may be a hazard to young quail. Carrying capacity can be judged by the abundance of certain key legumes and grasses; qualifying factors are commented upon. Brush control is necessary and if no brush-cutting equipment is used, it requires about as long to get a property back into condition as it originally took to get it out. Restoration after overgrazing also is a slow process. Protection of nearby areas from fire increases hazards from predators and means of controlling them must be considered. Interspersion of small fields and open woodlands is desirable, and clean cultivation of large tracts the reverse. Cover that can not be conveniently hunted through decreases the availability of birds and hence the value of the property. The paper is summarized in 8 short paragraphs.

Management: Inventory, carrying capacity ✓

Mitchell, G. E. The determination of carrying capacity on wildlife areas, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 140-148.

"The administrator's job is to produce and maintain the largest number of animals the habitat will support on a permanent basis. His greatest problem is to determine the sustaining carrying capacity of the habitat and hold it to the maximum." Lacking definite information as to the numbers of his charges and having little or no control over their movements, the wildlife manager must keep informed as to carrying capacity by constant appraisal of the condition of the forage plants. The objective is to hold a population that the range will support in good condition without deterioration of the principal forage species. The author describes a key area-key species method of determining range utilization and carrying capacity and discusses its application. The sedentary nature of big game suggests that management should be on a herd basis, each band being studied and controlled separately as the conditions of food, environment, and land use indicate. Any plan of management should be on the safe side so far as the food supply is concerned rather than favor numbers of game animals. Bibliography of 7 titles.

Management: Inventory, deer

Frodine, Gordon. Deer inventory studies in Minnesota, Proc. Minn. Acad. Sci. (H. K. Wilson, Sec'y.-Treas., University Farm, St. Paul, Minn.), 8, 1940, pp. 41-49, 5 tables.

History of deer numbers in the State. Good management requires reliable inventories. This paper reports on counts by the drive method made by adequate personnel. They are reported by regions, distributed by age and sex classes, and summed up in figures for deer per square mile. Author's conclusions: "(1) The deer census work involving the total deer count method on sample areas has revealed that an average population of 13.76 deer per square mile existed in the fall of 1939 over a total of forty-five sample areas comprising fifty-one square miles; (2) annual deer counts reveal a decline of three deer per square mile on the sample areas since 1935; (3) hunting take studies have shown that from one and one-half to two deer per square mile are

removed by hunters during the open hunting season; (4) winter mortality studies in the Superior National Forest show an average loss of eleven deer per square mile of wintering range since 1937 and that this loss, due largely to malnutrition, is in excess of the hunting take; (5) studies on the condition of the deer range indicate that in areas where more than average deer concentrations occur the capacity of the range to support deer is declining; (6) in order to adequately manage the deer herd in Minnesota, efforts must be made to control their abundance within the carrying capacity of the range and to maintain and increase the carrying capacity of the range through environmental control."

Management: Inventory, forage ✓

Schwan, H. E., and Lloyd Swift. Forage inventory methods, with special reference to big game ranges, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 118-125.

The most widely used method is one involving relative densities of vegetation. Its limitations are discussed and weight estimation suggested as an improvement. Instructions are given to its use. Bibliography of 16 titles.

Management: Inventory, hunter activities

Gordon, Seth, Jr. A sampling technique for the determination of hunters' activities and the economics thereof, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 260-278, 7 figs., 6 tables.

Author's abstract: "A method for sampling hunters' activities according to age, and income and occupational groups, was developed and carried on experimentally in one county in Michigan. Personal interviews were completed for about 300 individuals. Replies showed a uniformity when analyzed that is believed to be beyond the possibilities of mere chance. It was computed that resident hunters in the county spent $66,000, had an annual investment in guns of $20,000, and received $15,000 from furs trapped. They spent 94,000 hours hunting, killed 3,900 pheasants and 14,000 rabbits. The survey is believed to be of value from a number of standpoints and more accurate than the usual information received on hunter activities."

Management: Inventory, waterfowl, Minnesota

Smith, Don. Minnesota's waterfowl situation, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 3(14), Nov. 1941, pp. 12-15, 3 tables.

Discussion of weather and especially precipitation in relation to waterfowl. Results of a count by 41 observers on 11 areas. Total number of waterfowl nearly 50,000, of which about 27 percent were coots. On six areas the average number of ducks per mile of shore line was 26.9. In a nesting study, 83 percent of the nests were observed to be successful. Of 22 nests

destroyed or deserted, 41 percent were broken up by striped skunks, 18 percent by crows, and 18 percent by mowing.

Management: Land utilization program ✓

Wickard, Claude R. Wildlife's share in the use of the land, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 12-15.

Wildlife has both economic and spiritual values and is entitled to share in the use of land. Department of Agriculture activities aiding wildlife are instanced from the programs of the Soil Conservation Service, the Agricultural Adjustment Administration, and the Forest Service. Wildlife may also be regarded as a crop and its proper utilization calls for wise planning and good management.

Management: Mallard

Girard, Geo. L. The mallard, its management in western Montana, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 233-259, 1 pl., 3 figs., 2 tables.

Author's abstract: "The greater part of the information was obtained in three years' study on the Ninepipe and Pablo Migratory Bird Refuges, areas 2,002 and 2,540 acres, respectively, in Flathead Valley, Lake County, Montana. Management of the mallard is a year-round problem in western Montana and to be on the safe side the nesting season should be considered to extend from March 14 to August 18. Grasses proved to be the most desirable nesting cover and shore lines bordering small bodies of water were preferred. Success in rearing young was greatest on small protected bodies of water. Favorite resting areas were the shore lines of protected bays in smaller, and of peninsulas and islands in larger, areas. In western Montana during eight months out of the year the mallard is primarily dependent upon farm products for food. Aquatic plants are usually not plentiful in the early spring and late fall, and food areas newly flooded in those seasons are very attractive. Under certain conditions, winter feeding was very desirable. Information is given on the following habits, management practices, and characteristics: migration, spring feeding, cover, courtship and mating, honeymoon or rest period, nesting and egg-laying activities, incubation, hatching periods, egg characteristics, predators, resting areas, plumages, family life, survival of young, relationship to certain other nesting species, year-round activities, food and food areas, grit, farming programs, winter feeding, and hunting activities."

Management: Muskrat

Pirnie, Miles D. Muskrats in the duck marsh, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 308-312, 2 photos.

"Proper handling of a muskrat marsh should be aimed at maximum pelt production without serious injury to waterfowl habitats and foods." Control of water levels, removal of surplus and nuisance muskrats, and supplementing the natural food supply, may be necessary. Suggestions are made in each of these respects. Author's conclusion: "Although excellent progress has been made in life-history studies and in a few management techniques, many chances for new management are being overlooked. The control of water levels and managed trapping are the basis for good muskrat-waterfowl management. Special effort should be directed toward the natural restocking of marshes by bottom cultivation, special planting, and muskrat control. Legal protection of muskrats should be no more liberal than the animals require. Excessively short trapping seasons are wasteful and tend to discourage management."

Management: Overpopulations ✓

Barker, Elliott S. Removing surpluses of wildlife from the standpoint of State administration, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 362-367.

Account of the control of surpluses by regulated hunting of mule deer and antelopes; also by transplanting the latter animals. Trapping methods developed in the taking of more than a thousand antelopes are described.

Management: Overpopulations ✓

Cahalane, Victor H. Wildlife surpluses in the national parks, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 355-361.

"The broad purpose of wildlife management in the national parks is to restore and conserve a normal fauna in an entirely unimpaired environment, from which the public may derive inspiration, enjoyment, and educational benefits. Under ordinary circumstances, 'normal' conditions can be maintained only by allowing free action of natural forces. Except in unusual crises, any interference for the benefit of a particular species of animal or plant would almost inevitably react to the detriment of something else, and would mar the perfection of the picture of original conditions that we strive to present. The same result would follow any attempt to stabilize animal populations at a rigidly established level. The effects of natural forces are a desired part of the picture." Hence surpluses must be differently defined in national parks than in hunting ranges; they exist only when there is manifest overpopulation of the range. In migratory species that range may be outside of the park boundaries. If through livestock competition the outside range is depleted, or migration routes are blocked, problems of overpopulation in the park are intensified. These conditions are exemplified by the Yellowstone elk herd of which there is a surplus of about 50 percent. Artificial feeding and predator control also have resulted in surpluses of herbivores. Public feeding has brought on undesirable concentrations of bears, which for the safety of park visitors, must be controlled. Suggested methods of handling surpluses include: acquisition of additional winter range, hunting outside but near the

parks, destruction by officials of dangerous animals, and transfer of specimens desired elsewhere. Authority for more comprehensive procedures is needed.

Management: Overpopulations ✓

DuMont, Philip A., and William Krummes. Removing surpluses from national wildlife refuges, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 348-353, 1 table.

Authors' summary: "Surpluses of resident and confined populations of wildlife are resulting on certain of the national wildlife refuges. The normal diffusion of these animals to surrounding territory frequently is retarded through hunting pressure outside the refuge, through lack of a suitable adjacent habitat, and by fencing. The removal of surpluses has generally been by one of four methods: (1) Live-trapping by state authorities for restocking purposes; (2) public harvesting by trapping on a cooperative or fee-basis; (3) government removal of animals damaging structures or habitat; the reduction of predators; and trapping in connection with experimental projects; (4) disposition of animals from fenced game preserves by gift, exchange, or sale."

Instances of surplus disposals are cited for pheasants and muskrats in South Dakota, white-tailed deer in Texas, Gambel's quail in New Mexico for restocking purposes; skunks in North Dakota by way of predator control; and muskrats in Maryland and bisons in Oklahoma to regulate their populations.

Management: Overpopulations ✓

Shantz, H. L. Responsibilities and limitations in removing game surpluses on national forest areas, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 368-377.

The Forest Service has much responsibility but little authority in dealing with largely State-controlled wildlife. Public sentiment also is an obstacle to herd regulation as it is reluctant to admit that any surplus exists. Reduction being opposed, feeding is resorted to with the usual result of increasing the overpopulation. Natural causes of mortality are discussed but hunting is considered the best means of keeping herbivores in balance with the available forage. Usually it is not carried on intensively enough to really control overpopulations. Contributing difficulties are discussed and the statement made that authority is lacking for removal of what can safely be designated a surplus from a biological point of view. There is probably no more danger of losing our deer and elk than of losing our cattle or sheep. Still, neither type of animal should be allowed to destroy the productivity of our lands. Certain marked instances of game overpopulations and their effects in Arizona, Montana, Oregon, California, and Utah are discussed. In some, control has been undertaken, for others, agreement among interested groups is yet to be obtained.

"Economic and social surveys should, like forage surveys, aid in pointing to a reasonable solution of some of these problems. They should not be

solved by pressure groups or by the decision of those little acquainted with conditions but by a consideration of the future welfare of the resource and of the equities involved. The most important factors in the production of a good crop, which we may call a surplus are: (1) A place to live--the land with ample food and cover, and (2) a herd of high-quality breeding animals. In order to insure these requirements the herd must be controlled as to numbers and quality. This control should be by licensed hunters and the crop taken regularly to insure a sustained income to the State, the licensing agency and in such a manner as to afford the best recreational results, the best game animals, and leave a breeding stock of sufficient number and above all of superior quality, within the capacity of the local range. Control of the environment and control of the harvest are the implements of management."

Management: Planting, cuttings

Doran, Wm. L. The propagation of some trees and shrubs by cuttings, Massachusetts Agr. Expt. Sta. (Amherst) Bul. 382, 56 pp., March 1941.

Report on results from different methods of treating cuttings of a large variety of native and introduced species, the index to which occupies more than 9 pages. Bibliography of 130 titles.

Management: Planting, nursery practice

Engstrom, H. E., and J. H. Stoeckeler. Nursery practice for trees and shrubs suitable for planting on the prairie-plains, U. S. Dept. Agriculture Misc. Publ. 434 (Supt. of Documents, Washington, D. C. 25 cents a copy), 159 pp., 53 figs., 26 tables, 1941.

The desirability of tree planting in the prairie-plains region is pointed out and nursery practice discussed under the following heads: Collection and handling of seeds, selection and maintenance of the nursery site, water supply, ground preparation and seed sowing, germination and seedling culture, special methods, nursery inventory, lifting and field grading, winter storage, and shipping of stock, seedling protection, pathology of deciduous seedlings, and costs. Under seedling protection, damage done by mammals and birds is described and methods for controlling it are suggested. There is a bibliography of 54 titles and a reference list of the tree and shrub species treated in the publication. Of the medium to tall deciduous trees and conifers, 37 in all, 14, and of the short trees and shrubs, 28 in all, 14, are extralimital to the region.

Management: Planting for wildlife

Wright, Robert T. More food--more birds, Amer. Field (222 W. Adams St., Chicago, Ill. 20 cents a copy), 136(33), Aug. 16, 1941, pp. 148-149, 4 photos.

Suggestions as to food and cover plants. The statement that "the game population varies with the food supply" is an unguarded one--cyclic species for instance?

Management: Planting for wildlife, aquatics

Siegler, Hilbert R. Duck food nurseries for lakes and ponds, Texas Game, Fish, and Oyster Commission (Austin), Bul. 22, 8 pp., illus., June 1941.

Suggestion that wet-soil and water plants be tested in small fenced areas on the margins of lakes and ponds to determine which are worthy of more extensive use. The species important in Texas are listed, and hints are given on planting and fertilizing methods. Bibliography of 5 titles.

Management: Planting for wildlife, woody plants

De Franco, J. A. Planting woody plants for food and shelter for wildlife, Rhode Island Agr. Expt. Sta. (Kingston), Misc. Publ. 9, 10 pp. (mimeographed), April 1941.

Chiefly compiled matter on the management of plants variously utilized by wildlife. The planting recommendations are made for vines, ground cover, shrubs of 4 height classes and trees of 2 such groups. The species recommended are briefly annotated.

Management: Planting for wildlife and erosion control, legumes

Graham, Edward H. Legumes for erosion control and wildlife, U. S. Dept. of Agriculture, Misc. Publ. 412 (Supt. of Documents, Washington, D. C. 65 cents a copy bound in buckram), ii+153 pp., 29 pls., 3 tables, 1941.

This excellent and admirably illustrated book presents information on the value of legumes to the soil conservationist and wildlife manager. It discusses man's use of legumes and their role in soil improvement, as weeds and poisonous plants, in erosion control, and as wildlife utilities. A table presenting nutritional analyses of several species is included. Knowledge of wildlife utilization of legumes is "woefully inadequate," but such as it is, it indicates most patronage by rodents, ungulates, and gallinaceous birds. Nearly 100 pages are devoted to an annotated list of legumes, native and cultivated, in which synonymy and occurrence are treated, and appearance, habitat, outstanding characteristics, and wildlife utilization noted. There is an index to animals and the legumes they utilize, a list of common names of legumes with their technical equivalents, and a bibliography of 223 titles.

Management: Ponds

Allan, Philip F., and Cecil M. Davis. Ponds for wildlife, U. S. Dept. of Agriculture Farmers' Bul. 1879 (Supt. of Documents, Washington, D. C. 10 cents a copy), 46 pp., 29 figs., tables, July 1941.

Erosion control and other uses of ponds are treated. Suggestions are given for locating, constructing, and fencing ponds and for using vegetation

to minimize erosion hazards, both in the pond itself and on its shores. About a quarter of the pagination is devoted to lists, descriptions, and observations relative to the plants that are recommended, and ten pages to management of wildlife in and about ponds. A timely and useful publication.

Management: Shelterbelts

Orendurff, Carroll F. The first wildlife inventory of Nebraska shelterbelts, Nebraska Bird Review (F. M. Hoecker, 506 South 52nd St., Omaha, Nebr. 50 cents a copy), 9(1), Jan.-June 1941, pp. 7-8, 1 table.

The author cites the reasons for shelterbelt plantings and lists the principal species used. Responses to a questionary to bring out the value of the belts to wildlife are tabulated. Evidently they have had a very favorable effect, increases in various groups of farm wildlife being estimated at from 18 to 75 percent. "The consensus of cooperators returning the questionnaire was that the belts had proven of much value to Nebraska wildlife in furnishing protective cover from hunters, predators, and the elements, and in producing nesting facilities and food, and that these values would increase as the age of the belts advanced."

Management: Soil conservation in relation to wildlife

Graham, Edward H. Wildlife management as a part of soil conservation, Soil Conservation Service (Washington, D. C.), Misc. Publ. 23, 50 pp. (mimeographed), June 1941.

The history of soil conservation in this country is traced from the earliest records to the establishment of Soil Conservation Districts in recent years. The growth of the Biology Division with the Soil Conservation Service is described and its functions defined. Soil conservation practices beneficial to wildlife are discussed under 11 heads, the message of the publication is summarized, and a 14-page bibliography presented. A useful work showing the present status of its subject and referring to practically all of the pertinent publications.

Management: Stocking, partridge, Hungarian

Dale, Fred H. "Judgment suspended" on Hungarian partridge projects in Michigan, Michigan Conservation (328 State Office Bldg., Lansing, Mich.), 10(10), Sept. 1941, pp. 6-7, 2 photos, 1 map.

The map shows the locations at which both imported and propagated birds were released and the text gives the history of the species in Michigan. Most releases have been failures, none has been outstandingly successful. The birds first became established by spread from Ohio. Experience indicates that the birds do best on light soils in rolling uplands, and that moderately warm, dry summers are most favorable to their increase. They do best in cover that is not too dense and are well adapted to farming country.

Management: Stocking, raccoon

Steuwer, Frederick W. 'Coon stocking not for Michigan, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 10(8), July 1941, pp. 3, 11, 2 photos.

Ohio experience put the average cost of producing a raccoon in captivity at $6.40. As pelts have sold in recent years for about $3.50, pen rearing is uneconomic as a means of fur production. The cost is too high also to justify release for recreational hunting. If the entire amount of license fees paid by Michigan hunters of raccoons were spent for animals at the rate mentioned, it would purchase only 1,560; there are 10,000 hunters. Stocking is not necessary to recovery of the species in depleted areas as the young disperse widely. The take remains fairly constant (15 to 20 thousands annually) despite variation in length of the open season. The release of a comparatively small number of pen-raised raccoons would have little or no effect on the take. The history of animals released at the Swan Creek Wildlife Experiment Station is cited in support of that conclusion.

Management: Stocking, turkey

Goodrum, Phil D. Capture of wild turkeys in Texas for restocking, Pittman-Robertson Quarterly (U. S. Fish and Wildlife Service, Washington, D. C.), 1(3), July 1941, pp. 191-196.

Description of the types of traps used; with the best of them 731 turkeys were captured, only 5 of which died as a result of injuries received in trapping and handling. The methods of crating and transporting the birds also are noted. Pen propagation has been tried with variable results. Comment is made upon habitat improvement. The project has included work with both the Rio Grande and eastern subspecies of the wild turkey.

Management: Transplanting, mountain goat

Howard, L. J. Mountain goats moved to new home, U. S. Forest Service (Missoula, Mont.) Northern Region News, June 6, 1941, pp. 27-28 (mimeographed).

Trapped in a corral, the gate of which was operated by a wire pulled from a distance; bait salt. Twelve animals were captured, crated, and transported by truck. Weights of yearlings were from 40 to 60 pounds and of adults, 100 to 142.

Management: Turkey

Blakey, Harold L. Status and management of the eastern wild turkey, American Wildlife (American Wildlife Institute, Investment Bldg., Washington, D. C. 25 cents a copy), 30, No. 3 (Final issue), Oct. 1941, pp. 139-143, 2 photos.

Depletion of the wild turkey population has gone so far that the birds now "occupy less than 1 acre for each 100 acres on which they could be sustained" and the outlook for some of the remnant bands is discouraging. Favorable conditions that have long preserved the birds in South Carolina are now changing for the worse. The author describes management for perpetuation of the pure strain of native wild turkey on Bull's Island, S. C., and states that there is a "good" stock on the Kentucky Woodlands National Wildlife Refuge. A bill to establish a Federal refuge especially for the wild turkey has been introduced in Congress. Eighteen States have undertaken Federal aid projects for the benefit of the birds. Suggestions for turkey management are made. Acreages should be ample and cover, open. The use of controlled fire in the South is the most effective and economical tool for conditioning the environment. National forests are suggested as desirable areas for turkey management, but foresters probably will not adopt the author's burning policy. Much is being said nowadays about the excellence of the wild turkey stock of the Santee Region, S. C., but little or nothing about the man who did most to bring that excellence to attention and who made disproportionate sacrifices to arouse interest in its preservation. In those connections, the name of George E. Malamphy, of Wildwood, Cumberland, Md., should not be forgotten.

Management: Water holes

Allan, Philip F. Fence good conserver of soil and life, Western Farm Life (1520 Court Place, Denver, Colo.), 43(18), Sept. 15, 1941, pp. 4, 21, 2 photos.

Fencing off gullies and water holes by protecting the vegetation around them from livestock is a boon to wildlife. Examples are given of beneficial results.

Management: Wildlife on public lands ✓

Cline, Justus H. Administration of public lands, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 72-76.

There has been too much division of authority and too little consideration of the common end, which is preservation and improvement of man's environment. Wildlife in almost the entire United States "is like the man without a country. The landowner owns the land, the habitat, the food supply. The state, according to legal theory, owns the wildlife. If the landowner cuts down the trees that bear the nuts so necessary to squirrels, trees in which these animals den and rear their young, the poor creatures do not have a legal protector in the world to whom they can appeal. So with wildlife in general--it is in an utterly impractical and impossible situation as far as effective conservation is concerned." The writer discusses two plans for improving the situation that have been tried in Virginia. In one, the State, by legislation, granted to the Federal government all wildlife rights in a certain area in the George Washington National Forest. In the other, cooperative wildlife management, also authorized by law, between the State Game Department and the U. S. Forest Service was tried on two national forests.

Both plans worked well but the second is considered preferable. The extension of cooperative wildlife management to private lands is suggested.

Management: Winter feeding

Grange, Wallace B. Feeding wildlife in winter, U. S. Dept. of the Interior Conservation Bul. 13 (Supt. of Documents, Washington, D. C. 10 cents a copy), 20 pp., 9 figs., 1941.

Supersedes U. S. D. A. Farmers' Bulletin 1783; gives suggestions for feeding upland game and other land birds, waterfowl, small mammals, and big game.

Management: Winter feeding

Hicks, Lawrence E. Emergency feeding of game and song birds in winter, Ohio Wildlife Research Station (Ohio State University, Columbus), Release 154, 10 pp. (mimeographed), Dec. 1940.

The effects of clearing and cultivating upon birds and the desirability of modifying farm practice to aid them in winter are discussed. Methods suggested include: leaving standing corn, leaving shocks in the field, and feeding from shelters, and in other ways. There is a diagram and instructions for preparing permanent winter feeding shelters for wildlife. Attention is given also to attracting and feeding song birds. A list of birds occurring in Ohio in winter is presented with notes on foods likely to attract each of them. Bibliography of 42 titles.

AUTHOR INDEX FOR THIS ISSUE

	Page		Page
Allan, Philip F.	56, 59	Brodrick, Harold J.	34
Allen, Shannon	24	Bromley, S. W.	40
Ashbrook, Frank G.	46	Buckingham, Nash	24
Atwood, Earl L.	28	Bump, Gardiner	40
Bach, Roy N.	18	Buss, Irven O.	48
Bailey, Vernon	36	Cahalane, Victor H.	53
Bailey, W. W.	27	Chaddock, T. T.	6
Baker, John	5	Chandler, Asa C.	10
Barker, Elliott S.	53	Chapman, Floyd B.	49
Barnes, George	24	Choatum, E. L.	12
Baskett, Thomas S.	9	Clark, Arthur L.	43
Bass, C. C.	17	Cline, Justus H.	59
Board, Daniel B.	2	Collingo, Walter E.	32
Boeudette, F. R.	16	Cook, Fannye A.	29
Bellrose, Frank C.	43	Costello, David F.	8
Benjamin, J. R.	40	Cox, Herald R.	12
Blakey, Harold L.	58		

	Page
Crabb, Wilfred D.	33
Cunningham, Charles H.	14
Curtis, James D.	31
Dahlberg, E. M.	23
Dale, Fred H.	57
Dalke, Paul D.	25
Davenport, L. A.	45
Davis, Cecil N.	56
Davis, Gordon E.	11
Davison, Verne E.	45
Dock, Raymond S.	23
De France, J. A.	56
Dice, Lee R.	19
Doll, E. R.	17
Doran, Wm. L.	55
Duck, L. G.	20
DuMont, Philip A.	54
Durant, A. J.	17
Elliott, Charles N.	23
Engstrom, H. E.	55
Errington, Paul L.	21
Evans, F. C.	14, 15
Evenson, Millard C.	50
Fautin, Reed W.	34
Fitch, Henry S.	33
Fletcher, Jack B.	18
Forbes, E. B.	26
Fredine, Gordon	50
Friedmann, Herbert	2
Gabrielson, Ira N.	4, 5
Gaffney, William S.	26
Gauger, H. C.	14
Gaughran, G. R. L.	30
Gerstell, Richard	5
Girard, Geo. L.	52
Glading, Ben	19
Gloyd, Howard K.	2
Goodrich, Arthur L.	33
Goodrum, Phil D.	58
Gordon, Seth, Jr.	14, 51
Graham, Edward H.	56, 57
Grange, Wallace B.	60
Haecker, F. W.	30
Hamerstrom, F. N., Jr.	32
Hamilton, W. J., Jr.	30, 37
Hammond, Morrill C.	10
Hathaway, Edward S.	22
Hayne, D. W.	48
Hickey, Joseph J.	21
Hicks, Lawrence E.	47, 60
Hinshaw, W. R.	15
Hobmaier, M.	13
Hochbaum, H. W.	45
Holdenried, R.	15
Hopkins, Frank	32
Horn, E. E.	27
Howard, L. J.	58
Hughes, L. E.	12
Hungerford, K. E.	39
Ingles, Lloyd G.	35
Jackson, Earl	30
Jellison, W. L.	12
Kartchner, K. C.	7
Katz, Julius S.	11, 12
Kellum, Ford	37
Kofoid, C. A.	15
Komarek, Ed. V.	8, 49
Kotcher, Emil	13
Krefting, Laurits W.	18
Krummes, William	54
Lincoln, Frederick C.	5
Low, Jossop B.	36
Lundy, George	24
Lynch, J. J.	42
Nestler, R. B.	27
MacLeod, Alexander T.	3
Macy, Ralph W.	16
Manwell, Reginald D.	16
Marcy, Lawson F.	26
Martin, Charles F.	24
Mays, Alfred S.	11
McBeath, Donald Y.	35
McCain, Randal	42
McCann, Lester	22
McIvor, Barbara C.	11
McKenney, Frank D.	12
McNeil, E.	15
Michael, Enid	29
Mitchell, G. E.	50
Monson, Gale	22
Moore, George C.	35
Morgan, B. B.	15
Morse, Marius	29
Musselman, T. E.	40
Onslow, Walton	24
Orendurff, Carroll F.	57
Osborne, Ray	24
Palmer, Ralph H.	39

	Page
Parker, Lansing A.	22
Pearson, Allen M.	35
Petrides, George A.	25
Pettingill, Olin S.	23
Pirnie, Miles D.	52
Quortrup, E. R.	17
Randall, Charles E.	24
Randall, Pierce E.	38
Rasmusson, D. Irvin	20
Ratcliff, Harold M.	20
Ridgway, Robert	2
Rinzol, Anton J.	32
Ripple, Richard C.	14
Ritor, William E.	7
Roberts, Dave	24
Rollings, Clair T.	38
Roudabush, Robert L.	15
Ruhl, H. D.	44
Sandoz, O'Reilly	20
Schoffer, Theo. H.	37
Schoffer, Victor B.	41
Schunke, William H.	48
Scott, Thomas G.	9
Schwan, H. E.	51
Seghetti, Leo	12
Shantz, H. L.	46, 54
Shepherd, Lou A.	24
Shillinger, J. E.	17
Siegler, Hilbert R.	19, 56
Smith, Don	51
Smith, E. V.	7, 9
Soper, J. Dewey	34
Southern, H. N.	29
Spencer, Alice L.	33
Spencer, Donald A.	33
Sperry, Charles C.	27
Sprules, Wm. J.	18
Stabler, Robert M.	16
Steuwer, Frederick J.	58
Stewart, M. A.	14
Stoddard, Herbert L.	8, 49
Stoeckeler, J. H.	55
Stoudt, Jerome H.	40
Strand, Arnold	18
Strode, Don H.	38
Swift, Lloyd	51
Swingle, M. S.	7, 9
Thacker, Edward J.	26
Travis, Bernard V.	10
Trambley, F. J.	30
Viehmyer, Glenn	47
Voris, LeRoy	26
Wade, Dorothy R.	27
Wade, Douglas E.	3, 27
Wainio, Walter W.	26
Walker, M. V.	38
Waller, E. F.	15
Watson, J. S.	29
Waugh, Fran	28
Webster, J. Dan	31
West, Raymond M.	36
Wetmore, Psycho W.	11
Wickard, Claude R.	52
Wilder, H. G.	39
Wilson, Francis H.	13
Wright, Robert T.	55
Wright, T., Jr.	31
Yarham, E. R.	4
Young, Stanley P.	5, 6
Zahnisor, Howard	24
Zeliff, C. Courson	16
Zolinsko, Walter	42

1941

Page

18
16
58
14
49
55
40
18
38
51
9
26
10
30
47
26
27
27
26
38
15
29
28
31
36
11
52
39
13
55
31
4
6
24
16
42